Hertzberger Quartier

Residence & Retail & Recreation

AR3AR11 Heritage and Architecture Graduation studio

The future of Dutch structuralism architecture

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PREFACE

HERITAGE & ARCHITECTURE

In this graduation project, the future of Structuralism Architecture, I studied an adaptive reuse of Ceentraal Beheer by Herman Hertzberger. The main ambition of architectural experimentations is to find an appropriate balance between the heritage values protections and the future transformation of this iconic building. The new additions and alterations shall correspond with context, society and scientific frameworks. This research by design also includes were conducted through various perspectives which range from architectural/urban design strategies, techniques, and limitations. The results of these studies provide an essences transformation frameworks, intervention strategies, and design methods that contribute to the future of the Centraal Beheer in the coming future.

Suapha Vangvasu

CONTENTS

Centraal Beheer redevelopment journey

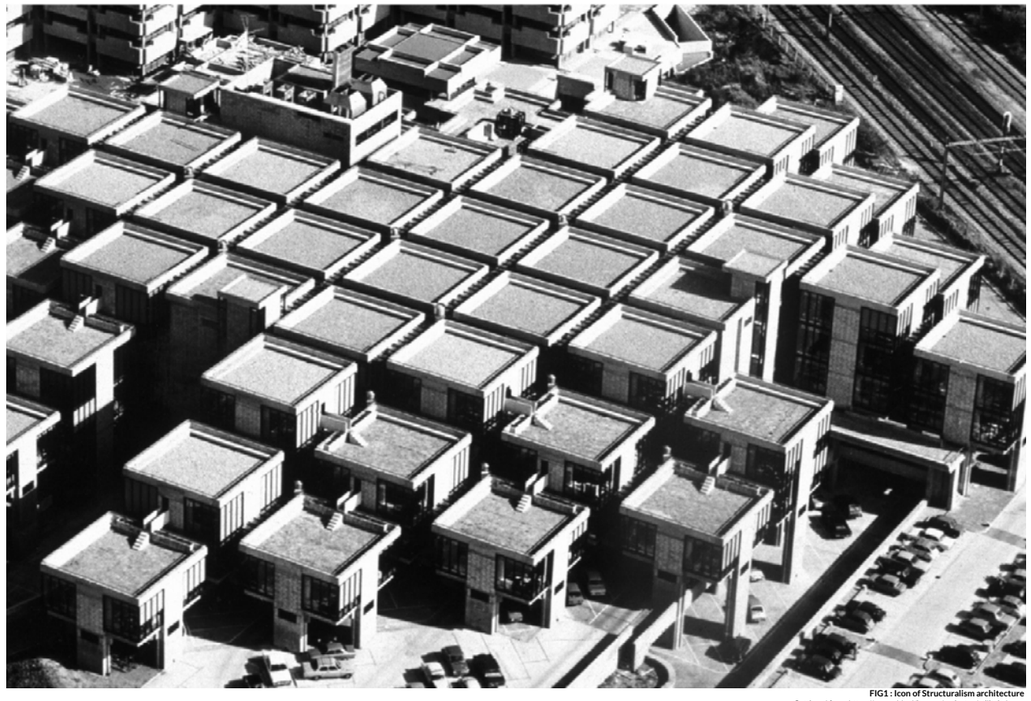


FIG1 : Icon of Structuralism architecture
Retrieved from: https://www.ahh.nl/images/projecten/utiliteitsbouw

CENTRAAL BEHEER
HEAD OFFICE BUILDING

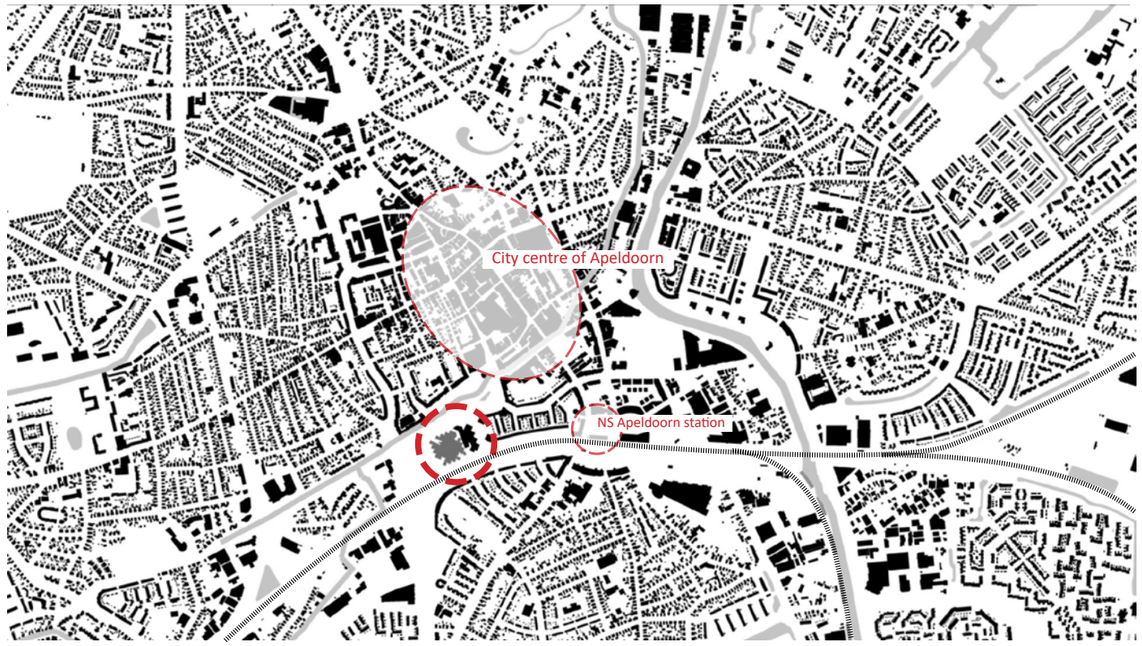
The redevelopment of this young monument was started with the tracing back of the historical values of the structuralism architecture in the Netherlands. Referring to P1 reports, this architectural movement was evolved around the middle of the 20th century, led by Team 10. It was a development and contradiction of the CIAM-Functionalism (Rationalism). At this point, Simon Blackburn stated that "Structuralism is a belief that human life is intelligible through the interrelations". It was aimed to facilitate human relations by providing an architectural structure for human coincidental meetings and interactions to occur. These design ambitions were translated into various design strategies win both tangible and intangible aspects. In the physical appearances, the structuralism architect building is composed of repetitive elements. The structuralist architects claimed that these repetition design can easily be enlarged or adapted to new functions. At the same time, this architectural movement generates spontaneous social interaction among their users, and that show respect to the needs of people of all ages.

The design of Centraal Beheer by Herman Hertzberger is a significant illustration of those mentioned design philosophies. This repetition design language, of 9x9 meter modules, offers a unique appearance to the complex. In this development, Herman Hertzberger expressed his position through the anti-hierarchy designs. He believed that 'individual user is equally important' so his designs always started with 'human relations'. Herman Hertzberger came up with the idea of creating office as a 'home'3 for those people. Hertzberger designed his building as a city. A grid of universal units separated by the inner streets that allow for social interaction to occur.

In contrast, the series of inner streets has shaped this building in a very rigid form which can be considered as one challenge for the future intervention. The design for a single function throughout the large footprint is another concerned in the future transformation. In the changing of function from semi-public to public/private, from single to multi-function, requirements are major amendments to the original design.

On the urban scale of Centraal Beheer, an icon of architecture in structuralism period, it seems like the building is neglected and threatened to be demolished from Apeldoorn city. In the future intervention, it is crucial to address this particular issue as well.

In the later parts of this report, the research question of "How could the existing qualities and original design philosophies of Centraal Beheer help strengthen the Iconic character of Residential Development?" will be studied and examined in details via several research methods and design strategies.



Apeldoorn in 2016
Retrieved from: Analysis Centraal Beheer, scope:time, 2017

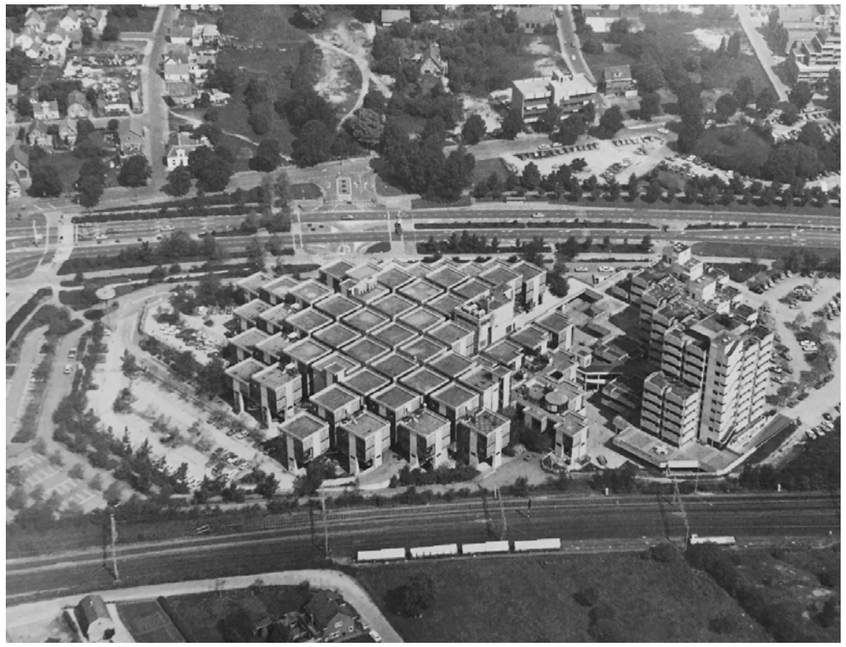


FIG1 : Site terrain of Central Beheer
Retrieved from: Heuvel,1992

ISOLATED ISLAND

Centraal Beheer is located in a piece of land surrounded by urban infrastructure; railway line, highway and street the inner area of Apeldoorn city. This surrounding context make Centraal Beheer as an isolated art object in the city with limited connection to other fabric.

FIG1 : Planning of Apeldoorn city centre extension
Retrieved from: E. Van ES, 2004

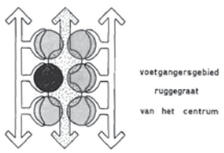
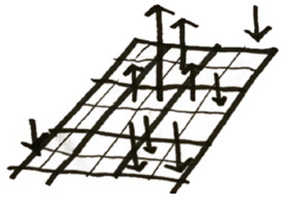


FIG1 : Central Beheer position in urban context
Retrieved from: Hertzberger, 1971

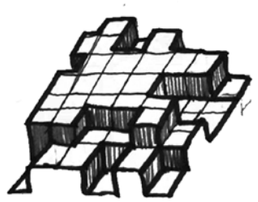
Building Volume

Comparing surrounding buildings height to the volume of Central Beheer office building (volume accommodated all facilities)



Down scale

To reduce the scale of massive building, Herman Hertzberger extrude and compress the envelope of different module.



Variety in height

Different height of module makes the better association of Central Beheer and context dialogue as the scale become more friendly.

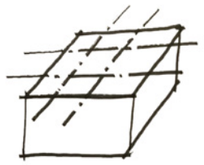
Relationship with context

Gradient of building height from lowest (one-storey) at the edge to highest (five-storey) in the middle. By doing this, the massive building has a smooth connection with surrounding environments.

FIG1 : Exterior of Centraal Beheer in 1972
Retrieved from: www.ajbuildingslibrary.co.uk

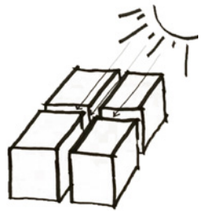
CASCADING FORM

From exterior, the cascading form has given a character to Centraal Beheer. The form of box stacking up is the result of structuralism design approach, to down scale this massive building at the edge to have an appropriate dimension for the pedestrian and surrounding context.



Subdivide building envelope

To make building envelope correspond to the interior space, the shell is also subdivided into equal size in the same manner as inner unit.



Seperation of building envelope

The envelopes with solid roof are clearly separate from each other where glass roof infilled the gabs. This allow natural light to shine into the building while create the corresponded footprint size with surrounding buildings.

Outside in

By separating building envelope, the building becomes porous and allows interior space to connect with outside environment.

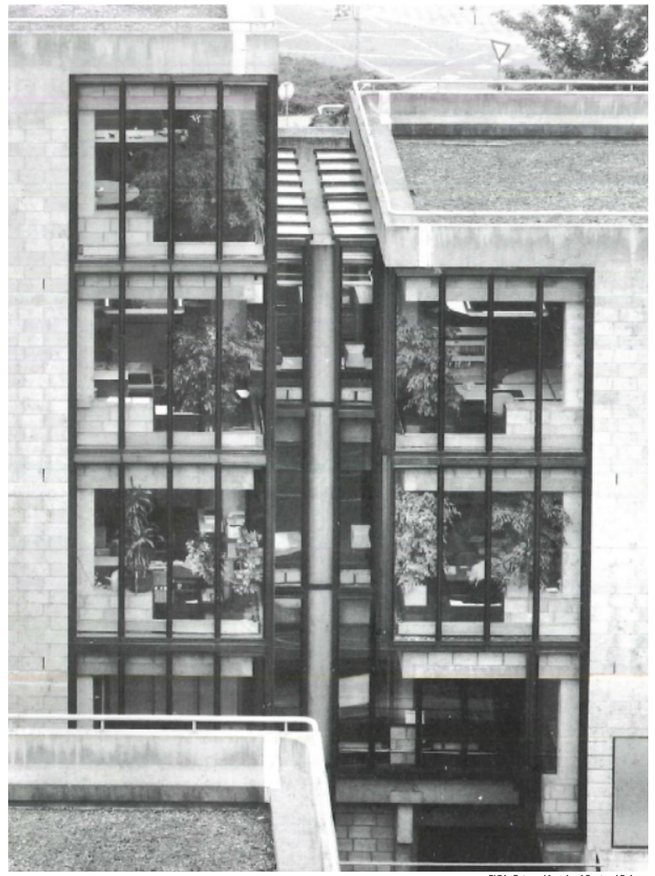
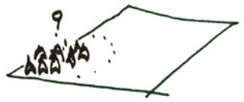


FIG1 : External facade of Centraal Beheer

Retrieved from: Herman Hertzberger : architect, A.W. Reinink, p46

FACADE COMPOSITION

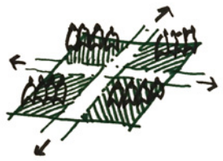
Façade design of Centraal Beheer has very unique character, solid wall in the middle and full height glazing window at the corner. This composition is related to the space division of the interior space. Between each module, glazing window and transparent roof is placed to provided natural light in this massive building.



Empty floor plate
Large and empty platform without any framwork creates intimidate space for the users.

Space division
By divide space in to human scale, it create a better space for human as the dimension is more relevant to human.

Seperation of module
By seperating space apart from each other, it create sense of belonging to the users.



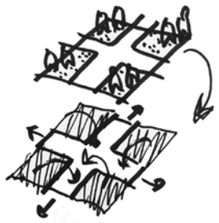
Working corner
Guiding on function zones make the user understand clearly which space is belonging to them.

Competence of space
Performance occur variously in the provided area.

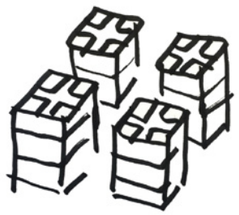
FIG1 : Working corners
Retrieved from: Internationale Licht Rundschau, 1974
Luchinher, 1987

INDIVIDUALITY

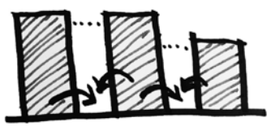
One of the main idea on interior space is 'individuality', which is resulted in a series of polyvalent space. A neutral design of working corner and materials selection in each universal unit is a competence that is arouse for users interpretation.



Indication of working space
As Central Beheer was an office building, Herman Hertzberger first started to design approrpriate space for working. The gap in between those private function is public zone.



Implement in building scale
The same method for creation of public space is also introduced in building scale. The gaps in-between module form public space for the complex.



Introduction of inner street
The negative space in between stacks of module become the inner street of Central Beheer where most social interaction occurred.

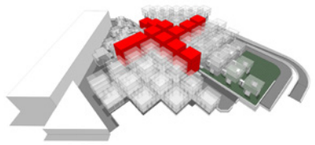
FIG1 : View of inner street
Retrieved from: Lüchinger, 1987, p47

SOCIAL INTERACTION

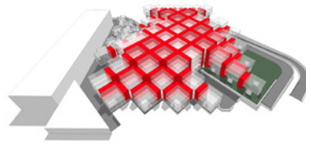
In Centraal Beheer, Herman Hertzberger put his emphasis on the idea of social interaction. Universal units are set apart of each other to create inner street. This circulation space will hold all the interaction, physical socializing and also visual connection horizontally, vertically and diagonally.

Building form & Composition

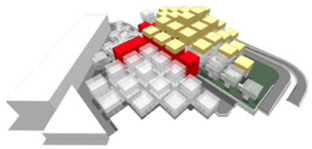
Composition
Four quadrants of function mass



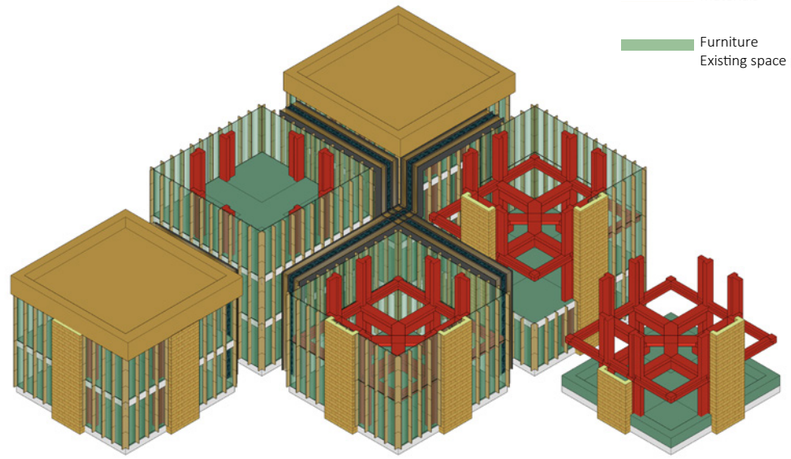
Main axis
Circulation and services venue link four wings together



Inner street
Allow for natural light and social interaction



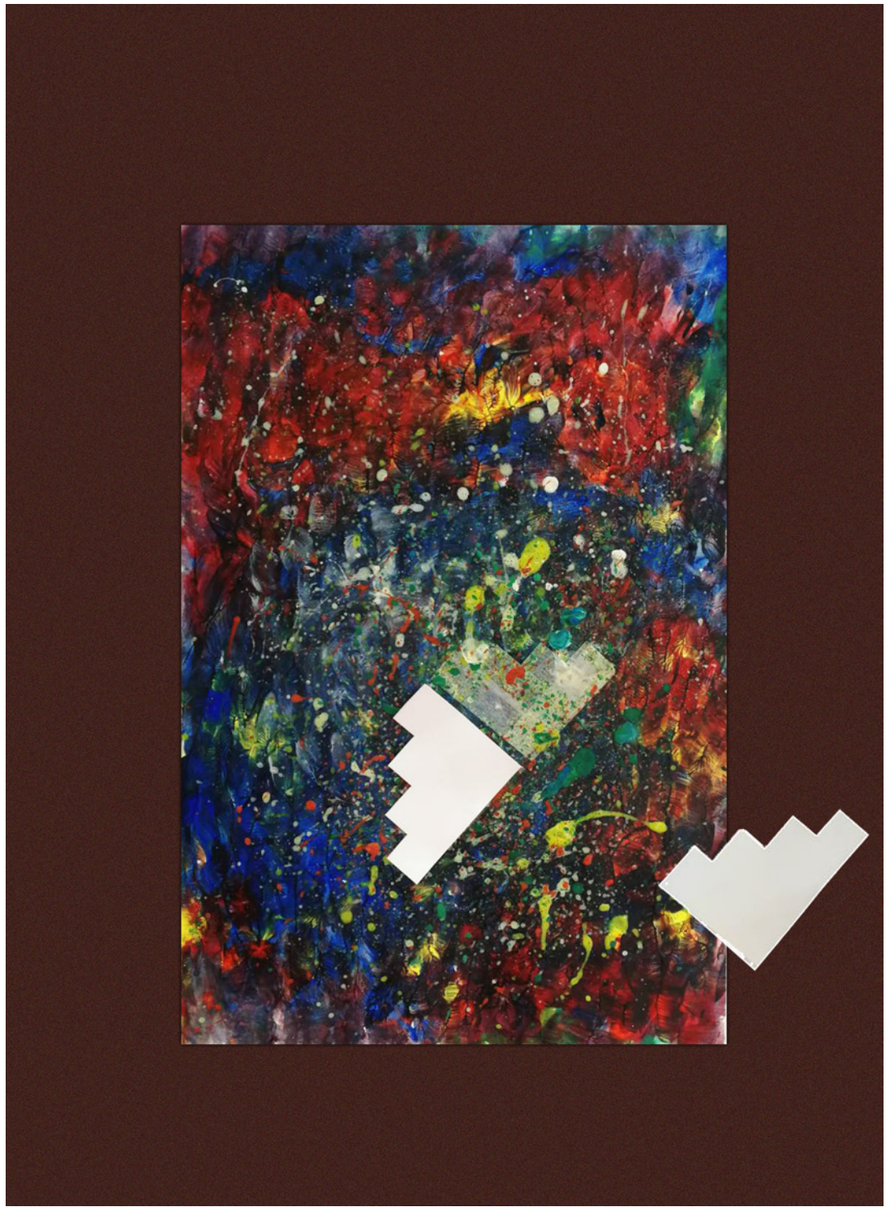
Building height
Gradient of building height from the edge to the centre



EXISTING QUALITIES

Tangible aspects
Centraal Beheer is an icon of structuralism architecture with a very notable design. The cascading form of universal unit stacking into a hill shape, design language of the façade and the prefabricated construction system have characterize this iconic building. This remarkable design composition is resulted from structuralism design philosophy human-based design. So these physical elements should be well preserve as it is the core idea of structuralism movement.

Intangible aspects
The two design philosophies that have major influence on the design of Centraal Beheer is 'Individuality' and 'Social interaction'. Individuality idea is resulted in the repetition of universal unit and raw material finishes, while social interaction had shape the overall composition(systematic of working space & circulation space).

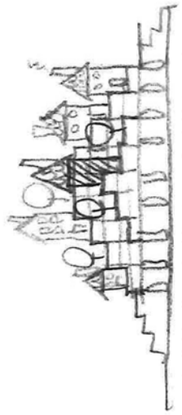
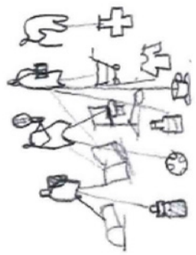
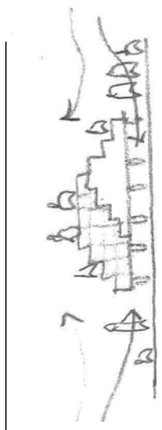


REDEVELOPMENT
OF CENTRAAL BEHEER

In the redevelopment of Centraal Beheer office building by Herman Hertzberger, the architect needs to assessing cultural value in two aspects; one is the general design philosophies of structuralism 'humanist-based design'; another aspect is specific design of Centraal Beheer as an office building.

Start from assessing existing quality of Centraal Beheer in both tangible and intangible aspects. Existing composition and design language of the building have high cultural value as it has been iconic building in Apeldoorn for over 50 years. The two design philosophies that influence physical appearances of Centraal Beheer the most is 'Individuality and social interaction'

The goal of this redevelopment regard to structuralism design approach, different function will result in various physical appearances depending on requirement of different programs. The design of this redevelopment will responded the certain requirements of proposed functions by various adaptive and reused methods of the existing built element.

ISSUE	PROBLEM	GOAL	DESIGN APPROACH
1 Design philosophies 'Individuality & Social Interaction'	Conflict between two design philosophies	**Balance individual and social space** in the new design	 Individuality + Architecture + Social interaction 'Elevated Community'
2 Icon of structuralism architecture	Change of function Office → Residential development	**To retain the iconic status** of this building	 'Community for ALL' intergenerational living
3 Isolated monument	Limited connection to urban fabric Art object in the city	**Building that belong to everyone**	 'Building of Apeldoorn'

KEY OBJECTS
The redevelopment of Centraal Beheer

1 Preserve characteristic of Centraal Beheer

This goal gives the limitation to the new development, as the new function should has similar parameter with Centraal Beheer Office, in order to enhance the existing characteristics. To me, 'Residential Development' is the best function to suit with existing characteristics. As 'home' is the place where people best express themselves and community is where social interaction take place.

'RESIDENTIAL DEVELOPMENT'

2 Retain the Iconic status of this structuralism architecture

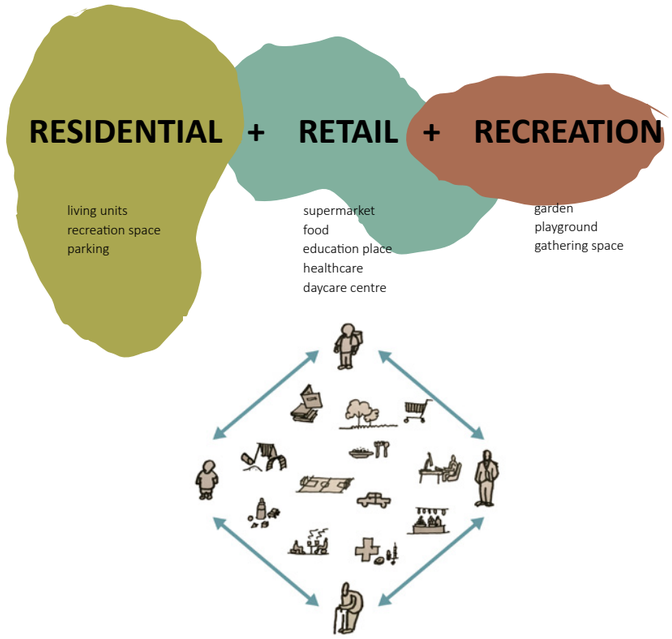
Aims of this residential development should be extraordinary in term of design and functions. This housing is designed for intergenerational living, a place where kids play together, everyone live together and grow old together. Beside designing comfortable apartment units, communal facilities and supportive functions to serve different age ranges are equally important for this development.

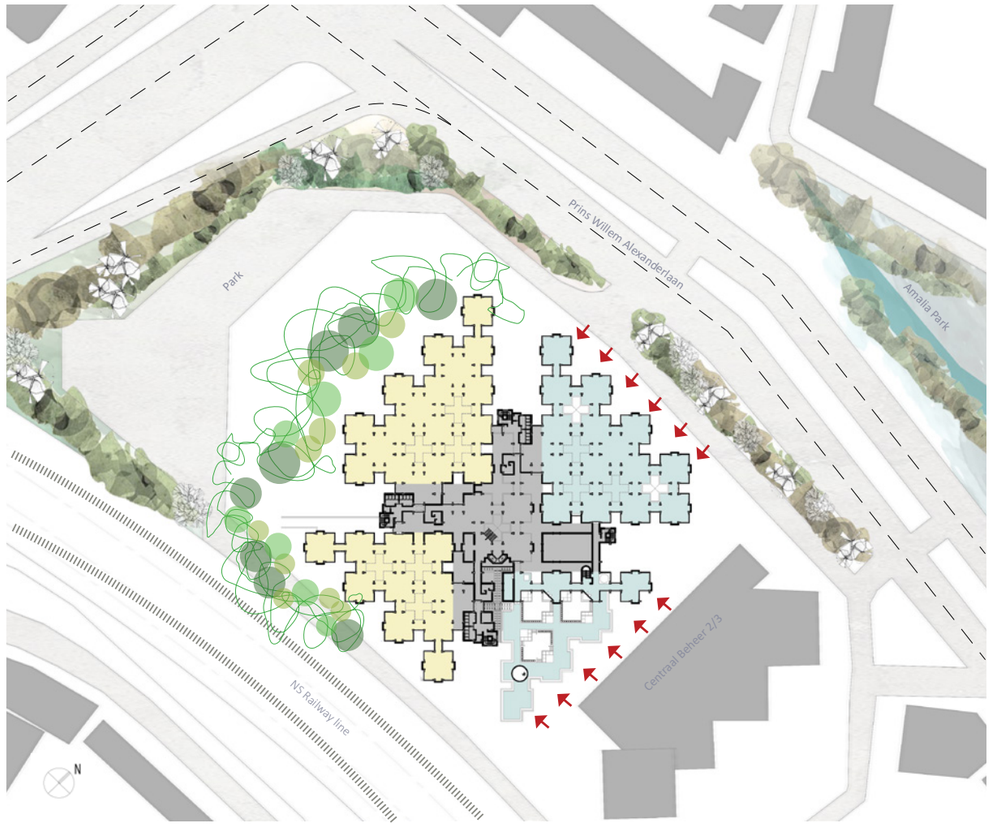
'VERTICAL COMMUNITY'

3 Develop Centraal Beheer as a building of Apeldoorn.

From the analysis, Centraal Beheer is isolated from other urban fabric even though its location is in the inner city area of Apeldoorn. Due to its semi-private function and introvert design, there is a limited connection between this iconic building and surrounding context. One of the major goal in urban scale is to bond this building with the residents of Apeldoorn city by offering public facilities and receiving architecture.

'BUILDING OF APELDOORN'



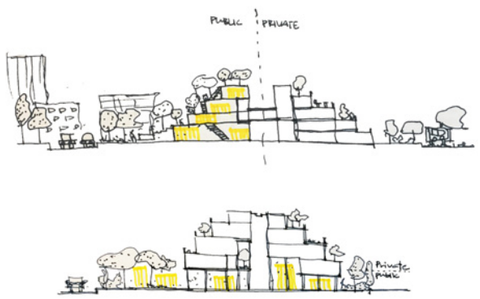


Residential

The intention of residential development is to continue the idea of individuality and social interaction from Herman Hertzberger. As 'home' is the place where people best express themselves and community is where social interaction takes place. This housing development will be design as intergenerational living community, a place that every live and play together.

Retail & Recreation

The aim of proposing public function is to improve the relationship of this iconic building with Apeldoorn city. This public facility is including commercial functions and recreational spaces. For the internal function daily function for basic need such as food, market, pharmacy and education will be house in to serve H Quartier residence and at the same time to attract neighborhood and Apeldoorn residents. For the exterior, recreational space will be locate throughout the building to create physical connection with the city

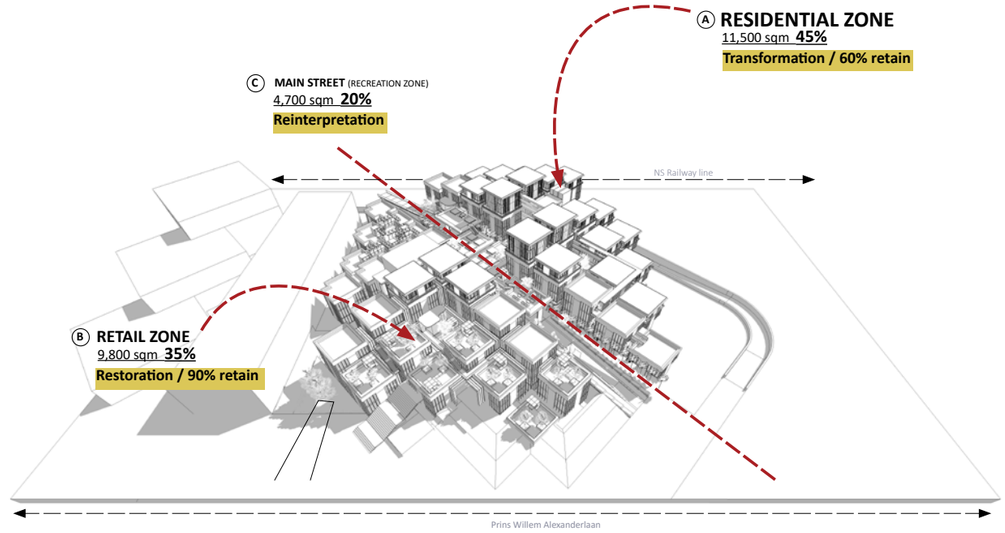


Zoning - function arrangement

From the program proposal, there are two major zone in the new development; public function and private function. Residential development requires certain level of privacy while retail and recreational function need an easy access for public use. In the existing design of Centraal Beheer, these zoning can be arrange in two scheme; one is divide horizontally, public function on the lower level private function on top; another scheme is to divide vertically. After analyzing surround context and building character divide zoning vertically is more logical. Housing is located at the rear next to the park, public function in front next to public intact area.

FIG1 : Housing development - The Kasbah by Piet Blom
Retrieved from: https://www.flickr.com/photos/laurensh/8633301761

FIG1 : Office function - Centraal Beheer by Herman Hertzberger
Retrieved from: https://indebuurt.nl/apeldoorn



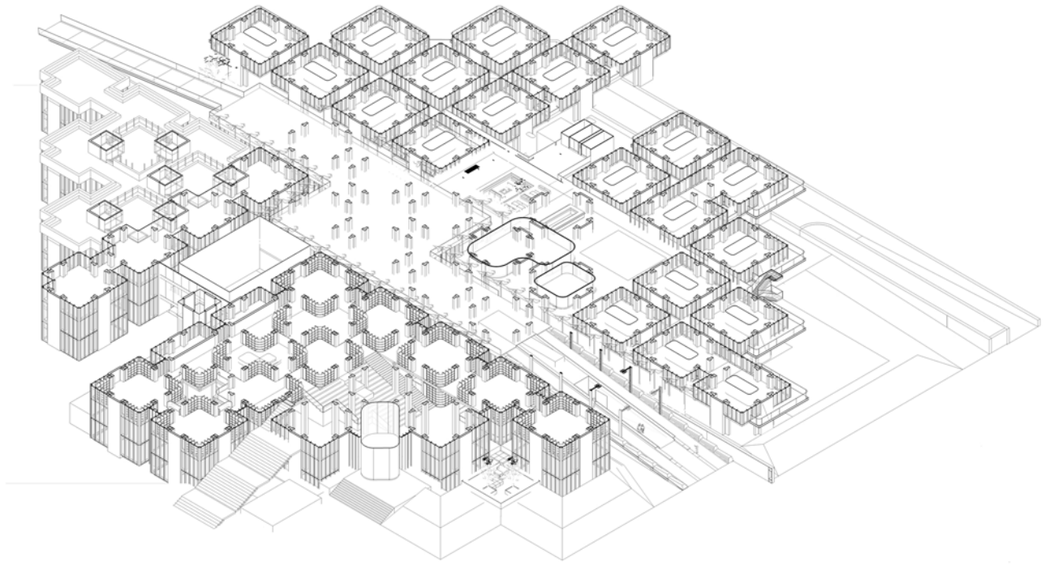
Positioing & Intervention strategy

From heritage and architecture point of view, preservation of all existing qualities in the extant build fabric is the highest aim. In case of this post-war heritage architecture, in structuralism movement, new alterations and additions to these young monuments are different from other civic heritage architectures from the pre-war period. It is much more flexible due to its age value and the humanity based design philosophies.

By doing a research on structuralism movement, I realized that the structuralism architects were not looking at their buildings as absolute complete architecture, instead, they looked at it as a framework. They were just providing a set of structure which based on human relation including supporting system, overall design composition and competence. Herman Hertzberger see the users as his co-designer who will finish the building with their own preference.

In this redevelopment, I position myself as Herman Hertzberger co-design who will interpret the original design of Centraal Beheer to be suitable for the proposed functions under to frameworks that the original architect had set.

As the new development have multi-functions, some can be adapting in the extant built fabric directly, some need to modify. So intervention strategy to transform this office



Hertzberger Quartier

Residence & Retail & Recreation

Drawings

RETAIL ZONE

Intervention strategy : **Restoration / 90% retain**

Functions : **Supermarket**
Retail stores
Medical clinic
Day-care centre
Residential apartments

MAIN STREET

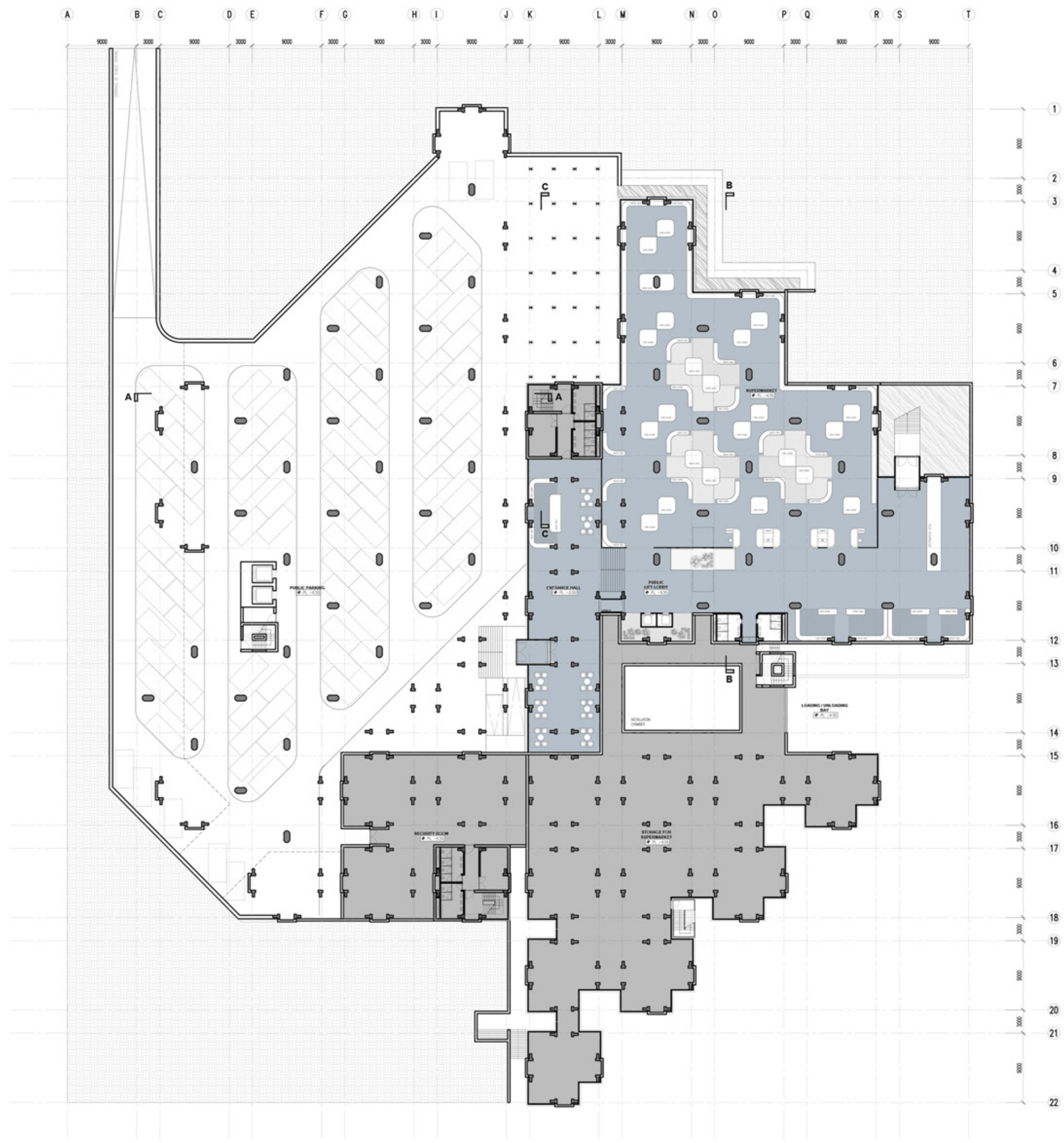
Intervention strategy : **Reinterpretation**

Functions : **Main entrance**
Main circulation
Gathering space
Recreational space

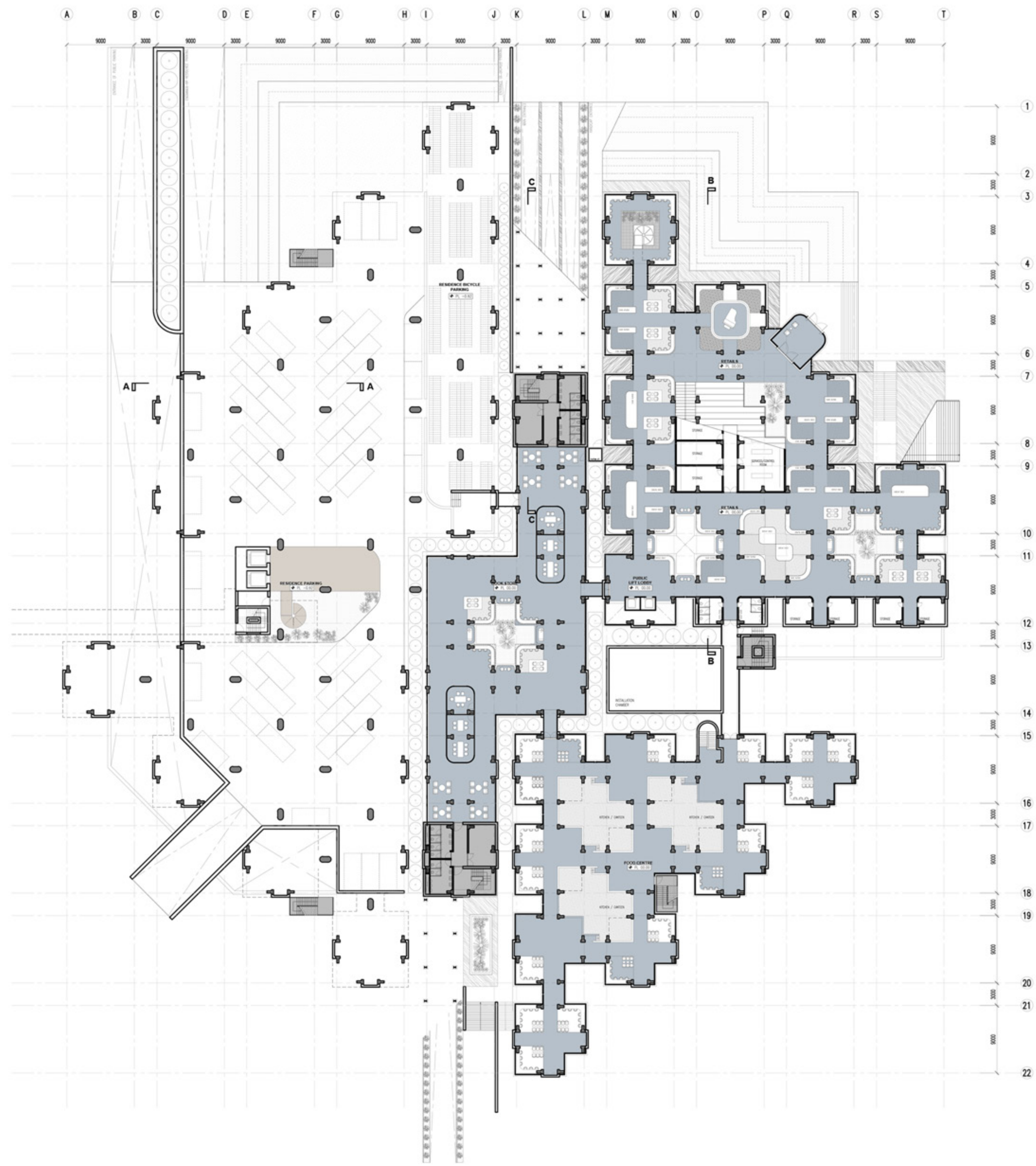
RESIDENTIAL ZONE

Intervention strategy : **Transformation / 60% retain**

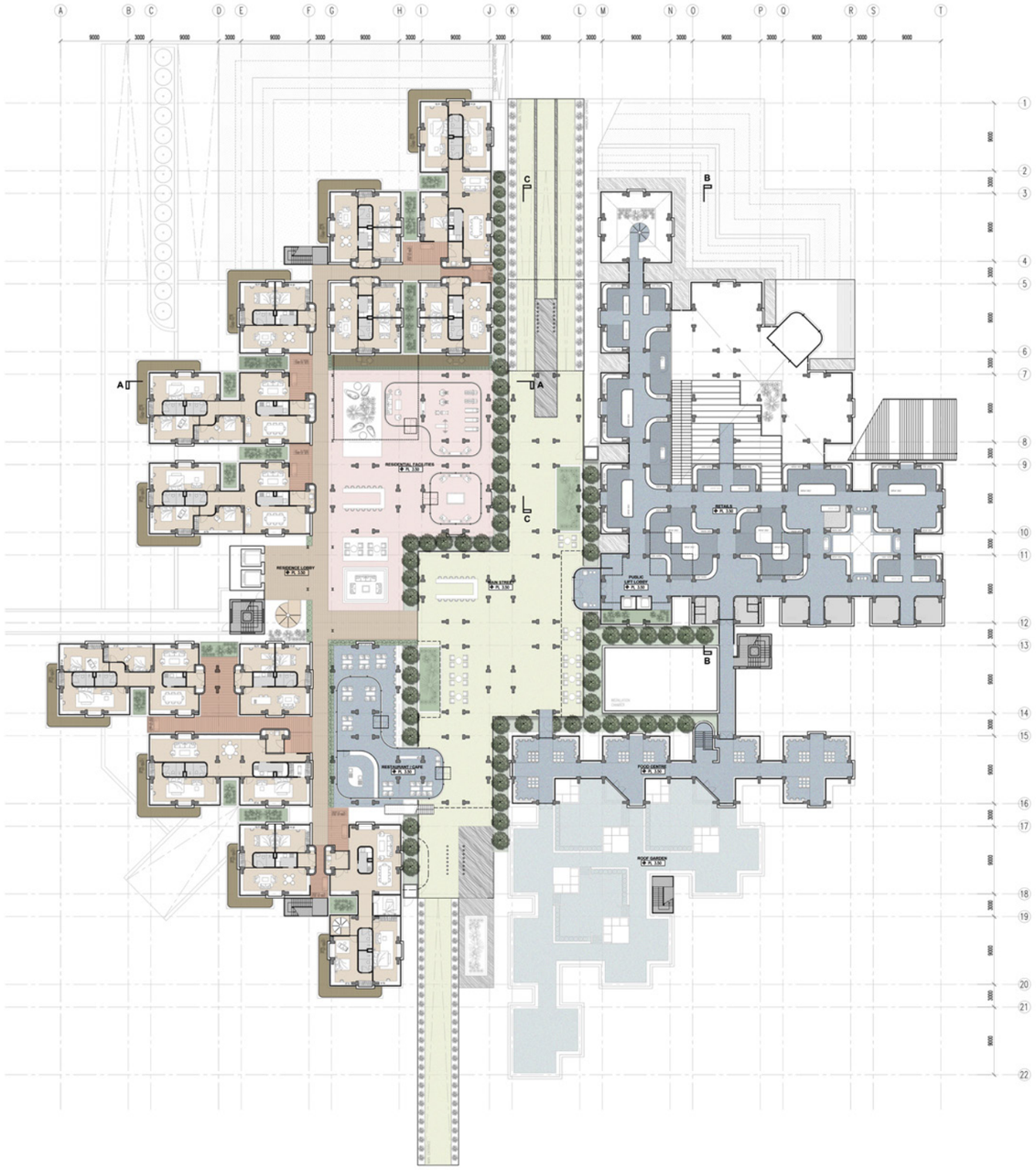
Functions : **Residential apartments**
Communal facilities
Recreational spaces



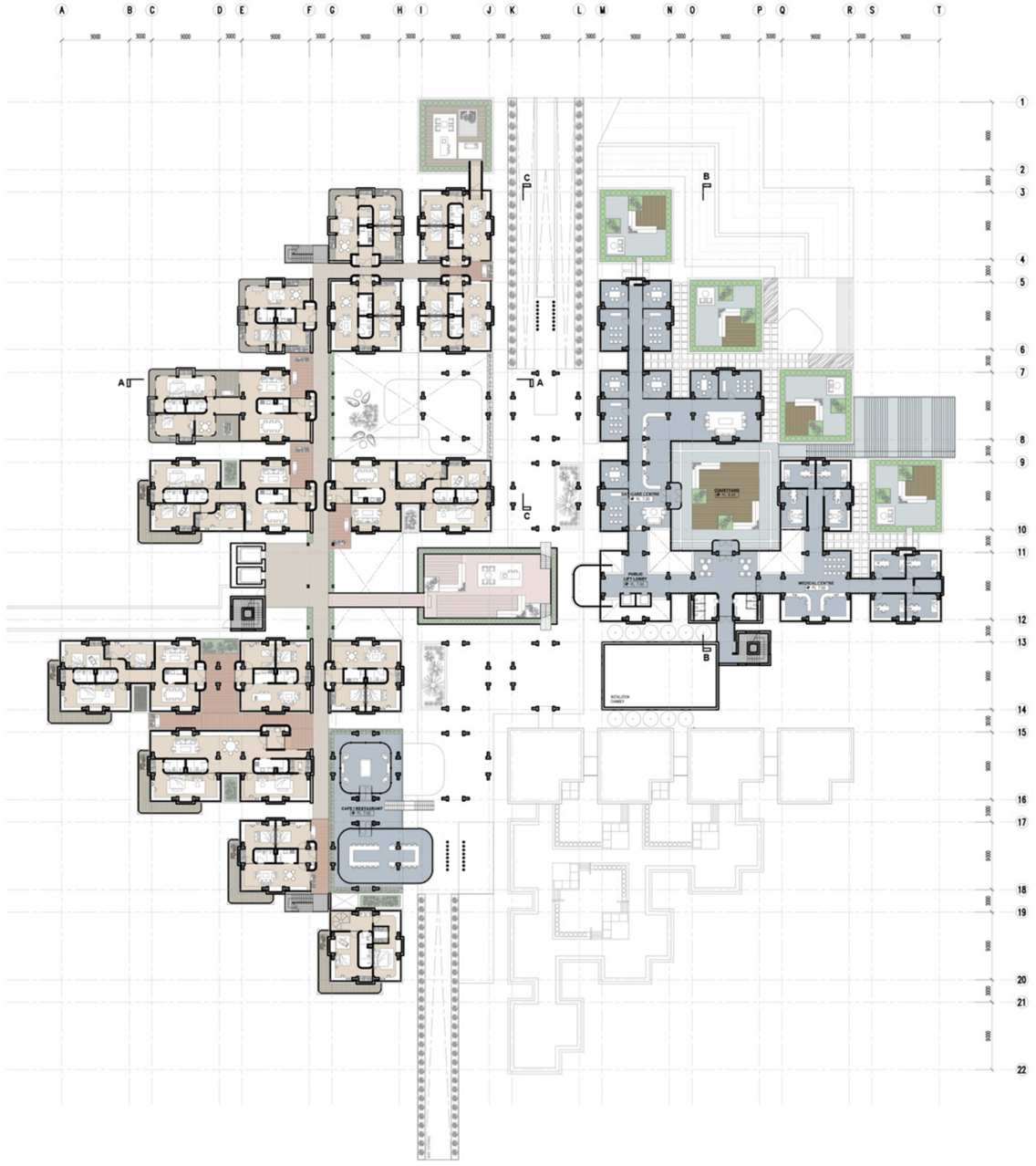
BASEMENT PLAN
scale 1:750



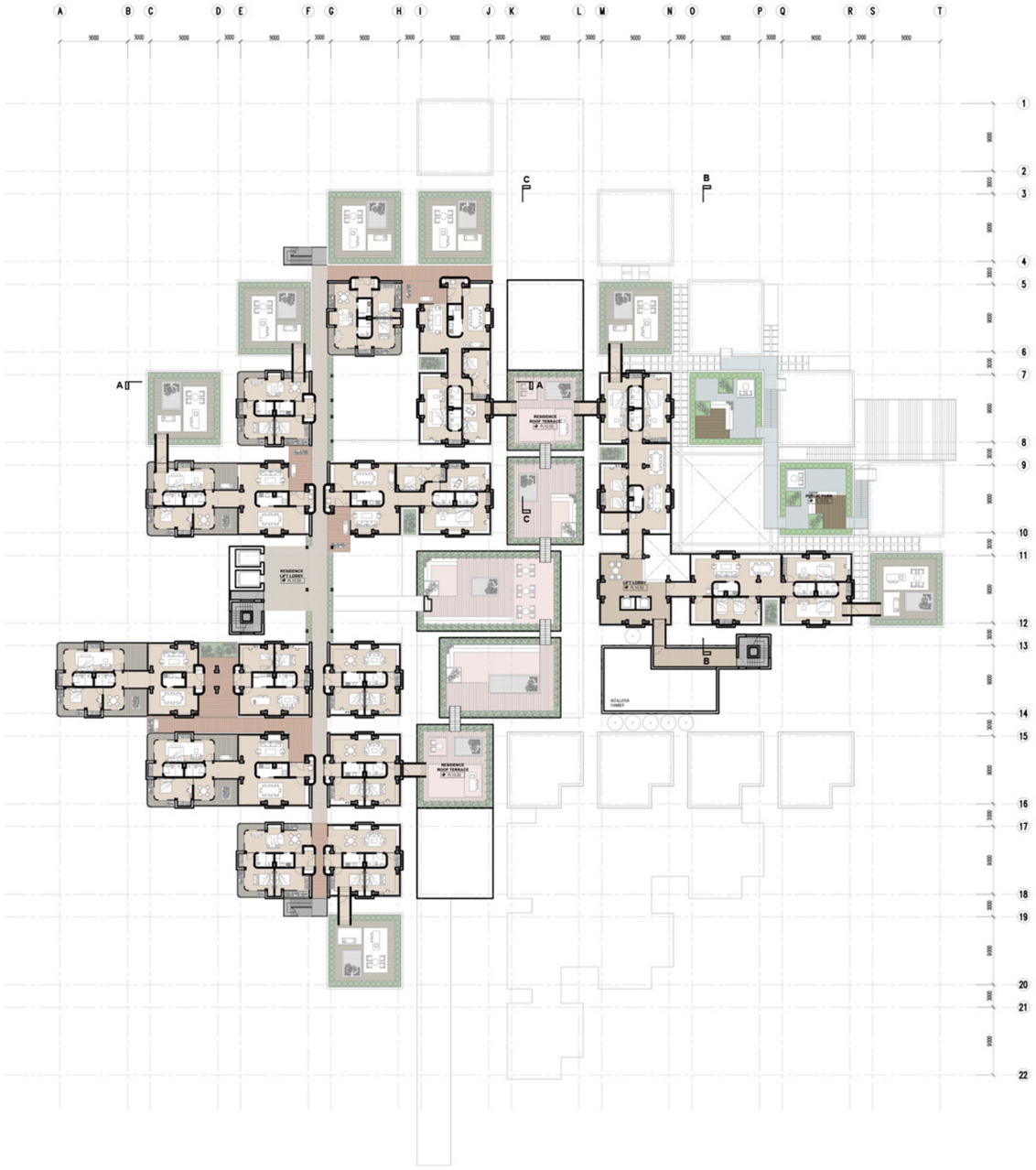
GROUND STOREY PLAN
scale 1:750



1ST STOREY PLAN
scale 1:750

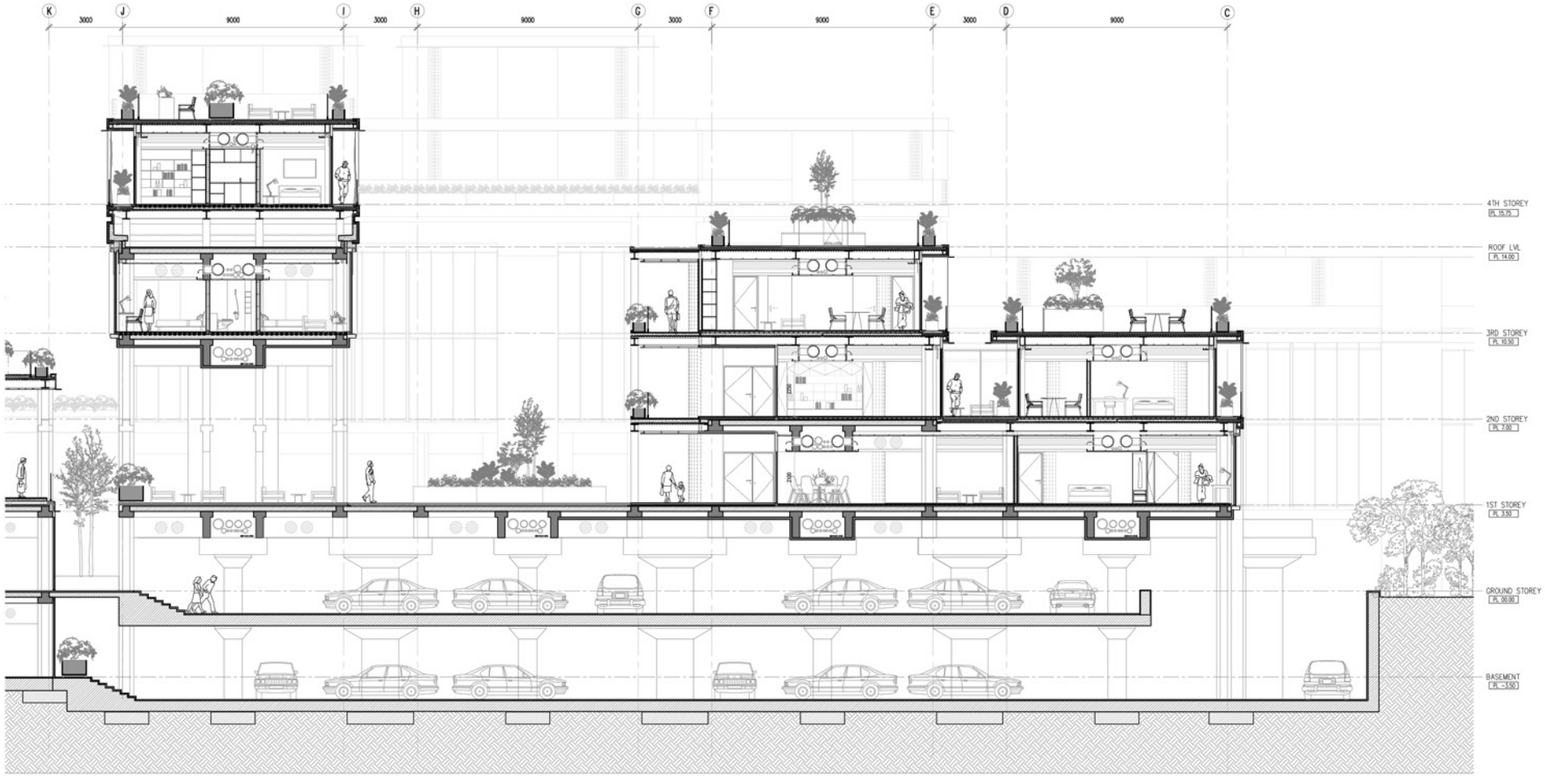


2ND STOREY PLAN
scale 1:750

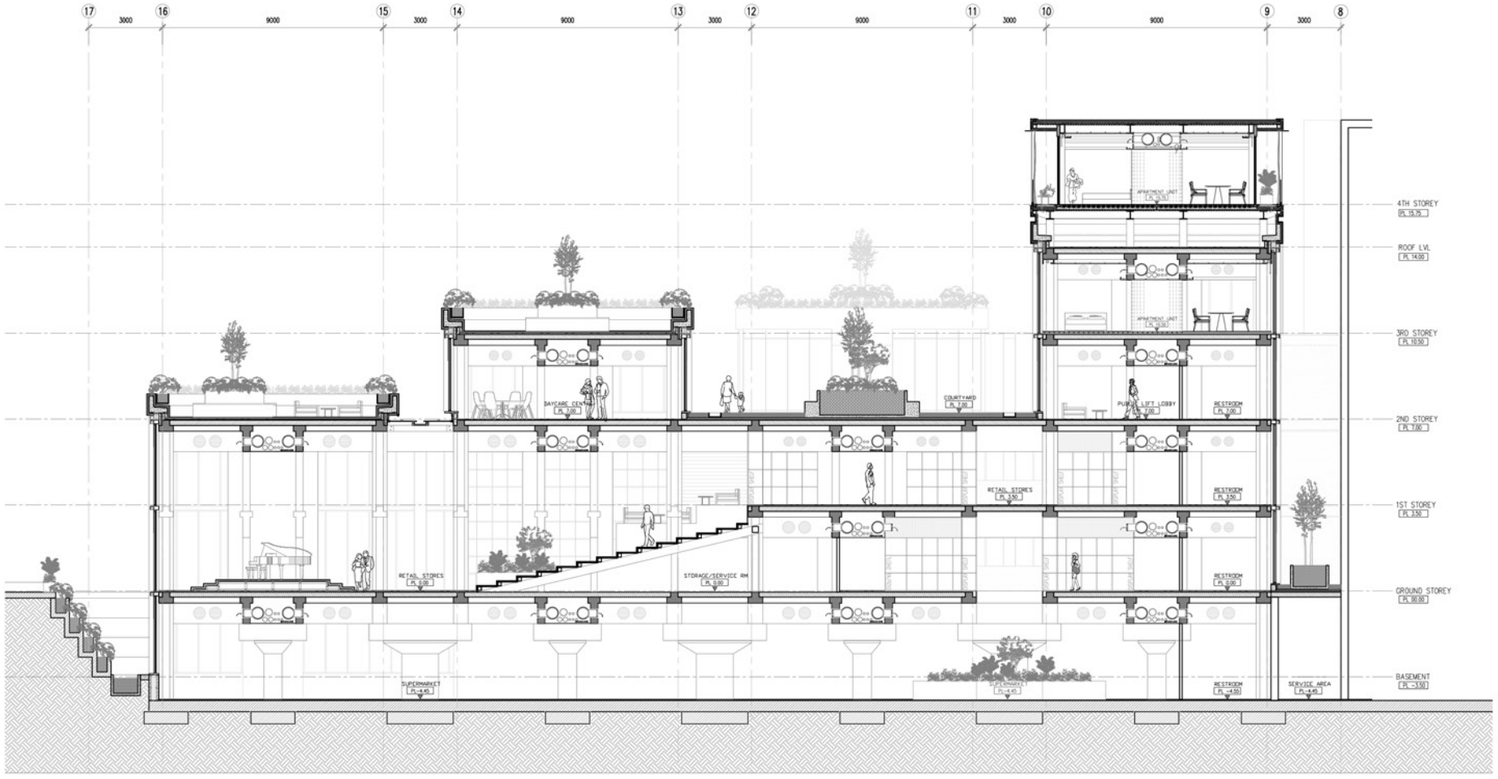


3RD STOREY PLAN
scale 1:750

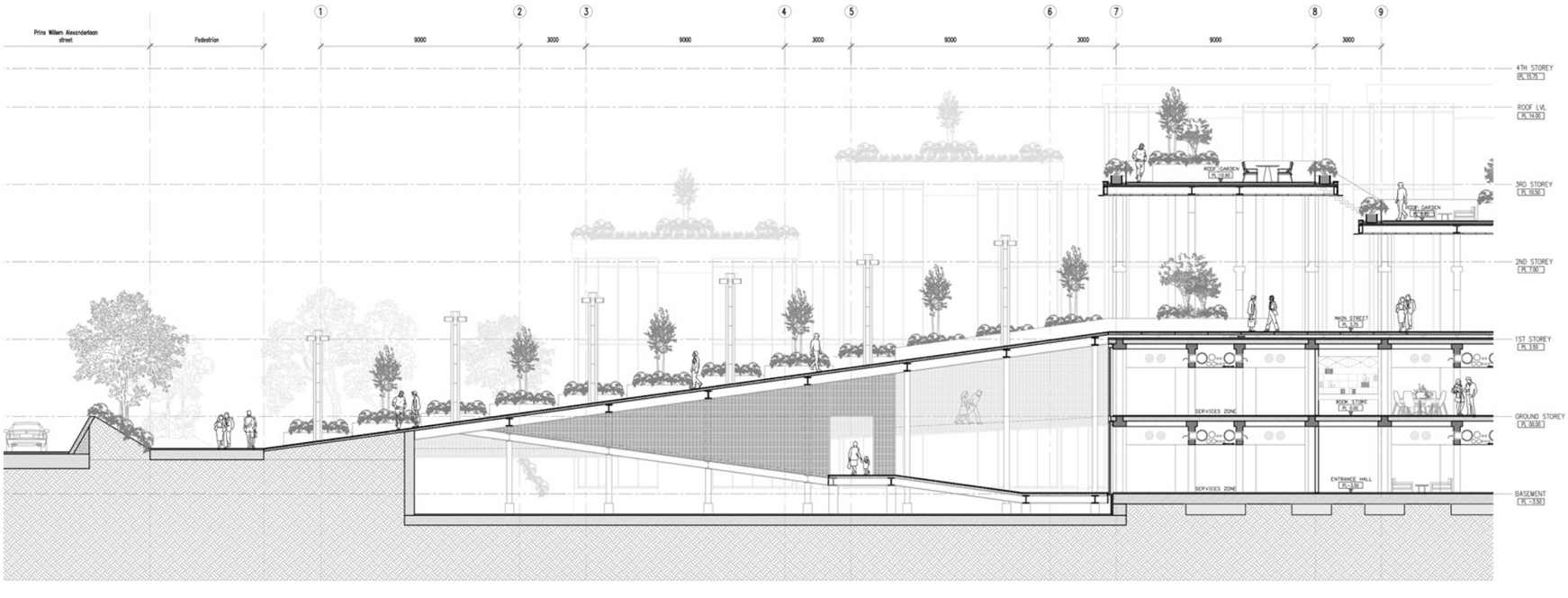
4TH STOREY PLAN
scale 1:750



SECTION A-A - Residential zone
scale 1:250



SECTION B-B - Retail zone
scale 1:250



SECTION C-C - Main street
scale 1:250

Master Planning, urban scale

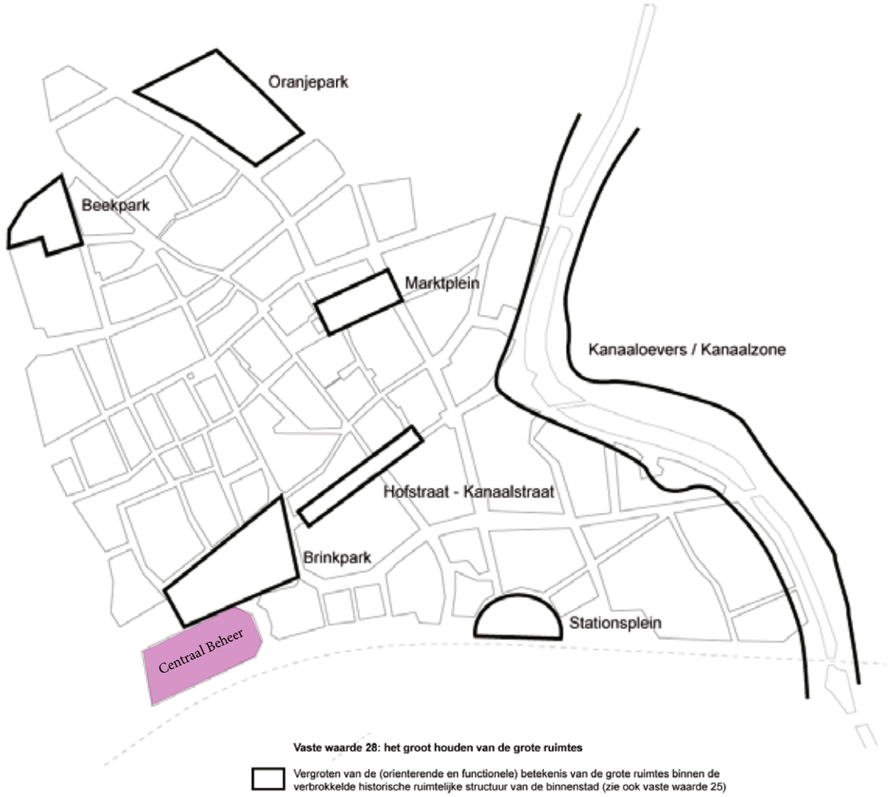


FIG1 : View of inner street
Retrieved from: Apeldoorn Gemeente, Regieplan Binnenstad, p.79

AMBITION IN URBAN SCALE

connect Centraal Beheer to urban fabric

Gemeente city planning
Since 2010, Gemeente of Apeldoorn has vision to develop open spaces around the city to be landmark and to give a sense of direction in urban level. The two spaces that have been successfully develop is Beekpark and Marklplein, occationally these park/plaza will house public event. Still they continue to develop other parks, Brinkpark (Amalia park) is also on the list. By redeveloping Centraal Beheer, I proposed to also develop the park at the same time, connect the park and an iconic building together would create an important landmark for the city. By doing so, Centraal Beheer will be connected to the urban fabric as well. The connection of Centraal Beheer and urban fabric is not only limited to physical connection, visual connection could also play an important role to integrate the building in city plan.
Physical connection

Physical connection
As the park and the building is in the opposite side of the road physical connection is limited to certain level. Large zebra cross is provided to connect both side and the continuous of greenery help to link the two function together.

Visual connection
Due to the limitation of physical connection, design strategy for visual connection will play an important role in this ambition. By framing visual connection of people, from the park people will always see Centraal Beheer as a backdrop, this helps to diminish the boundary between Centraal Beheer and the city. Reconnecting the building to urban tissue will also benefit the public function and added value to this iconic building.

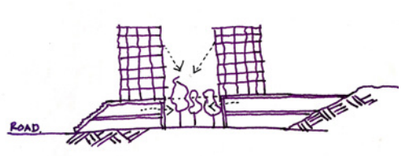
BUILDING IN THE PARK
Precedent studies

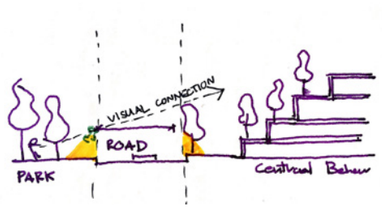
Kroller Muller Museum
Otterlo, Netherland

Building constructed in Hoge Veluwe National Park

Bibliotheque Nationale
Paris, France

Creation of forest – Bibliotheque Nationale of France is located in an urban area. From outside this building is just like usual tower, but from interior space it totally different. It is very green and fresh by the creation of forest in the middle of the building to create a pleasant view for user.

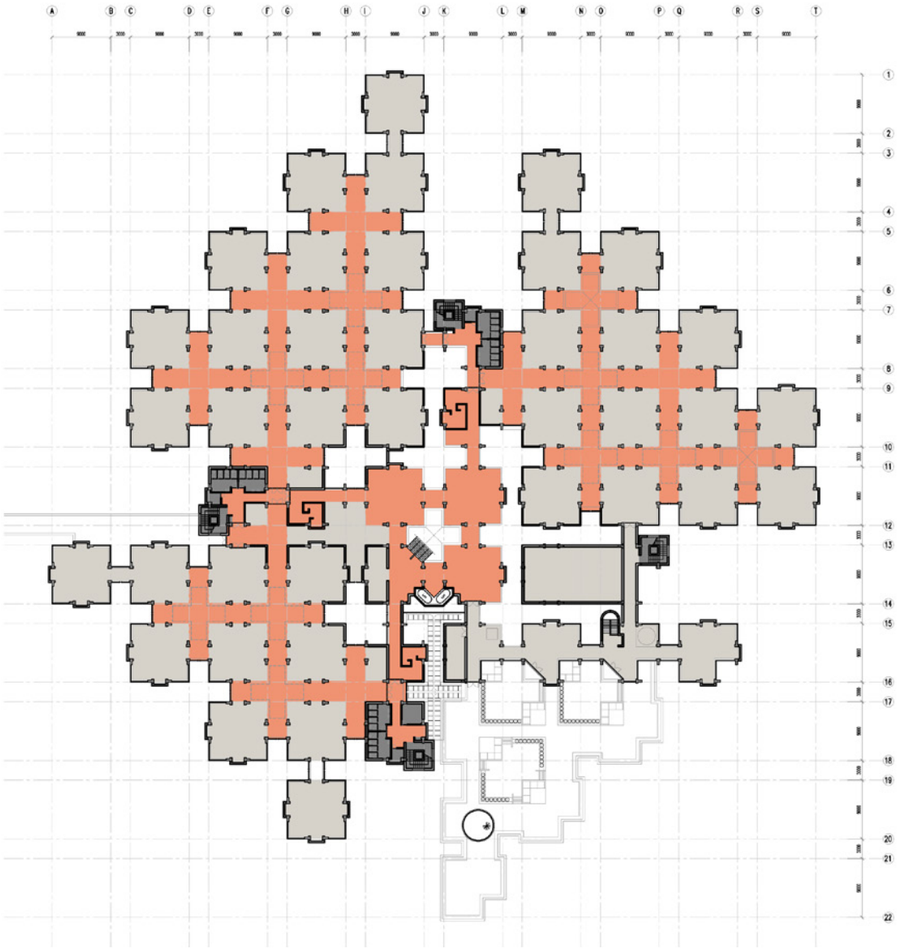




Centraal Beheeer
Apeldoorn, Netherland

The main challenge to connect Centraal Beheer to Amalia park at the opposite side is 'Prins Willem-Alexanderlaan' street. As the street in between, physical connection is limited. However, visual connection could be the solution. A meter height tuff is introduced along the street to create a green belt blocking the street out of visual connection. So people will see Centraal Beheer as the backdrop of Amalia park and the other way round.

Master Planning, building scale



CIRCULATION ROUTING

POSED PROBLEM

Centraal Beheer has a clear design of circulation routing in the diagram. Pedestrian routing is located in the inner street, space between each universal unit. However, in three dimensional contexts, this no hierarchy circulation system is confusing. The building visitors will be confused by this repetition of walkway both in dimension, position and appearance. This is one of the main challenge for the future development.

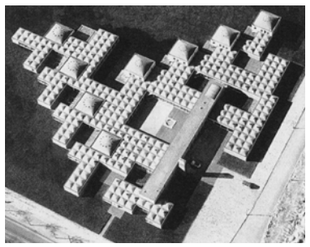
GOAL

By transforming this office building into a multi-function complex, it is essential to provide sense of direction and a distinction between different zones. It can be accomplished by creating a hierarchy of circulation routings such as main street and alley, or by inventing landmark to give a sense of direction to comfort the users with safe and secure feeling, which is one of structuralism philosophy.

CIRCULATION DESIGN
Precedent studies

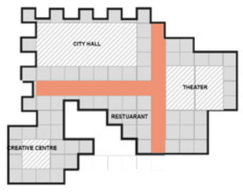
Research and analysis on circulation routing of different structuralism buildings offer the most suitable solution for the redevelopment of single function to multi-function building. De flint cultural centre is a good case study as it combines number of public functions together, a clear entrance and routing is an important element to comfort different types of user. This design principle helps to formulate and assure on the creation of the main street in master planning of the redevelopment.

AMSTERDAM MUNICIPAL ORPHANAGE
by Aldo van Eyck



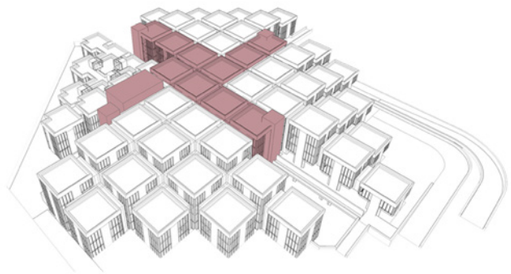
RAADHUIS TER AAR
by Joop van Stigt

CULTURAL CENTRE DE FLINT
by Onno Greiner



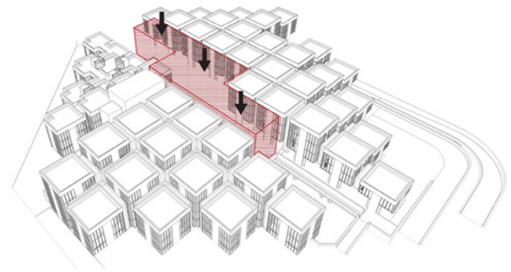
MAIN STREET
Design process

Main street will be point of attention in this complex. Various activities will occur in this location, pedestrian connecting the front and the rear side of the building, communal spaces, gathering spaces. The removal of universal towers will gives the relieve to this massive complex and marks a clear entrance of this building.



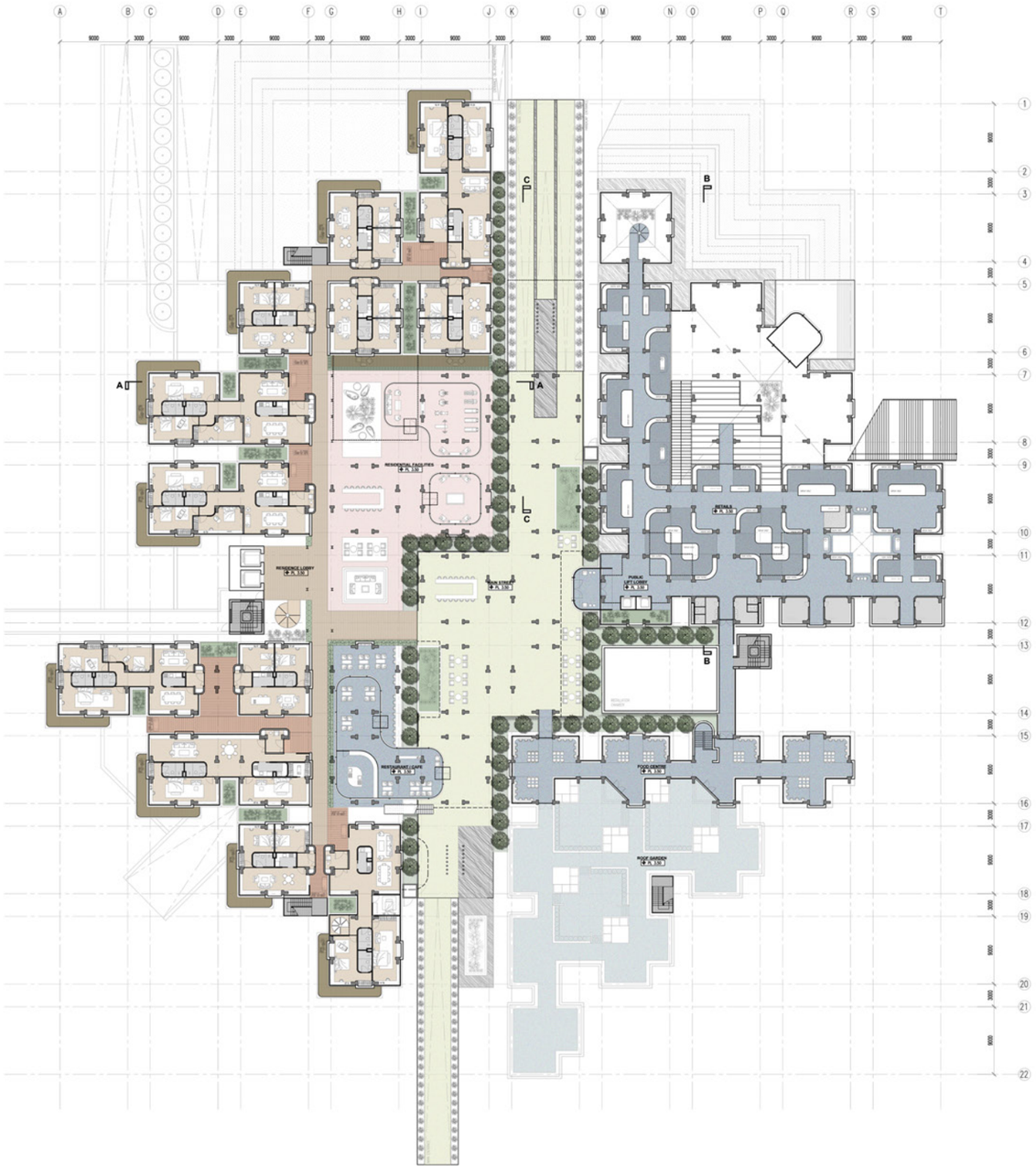
ORIGINAL DESIGN
of Centraal Beheer

The central core in the original design of Centraal Beheer was assigned to be service zone serving the four quadrants of working space. Vertical logistic, entrance of the building and interaction space also contain in this axis.



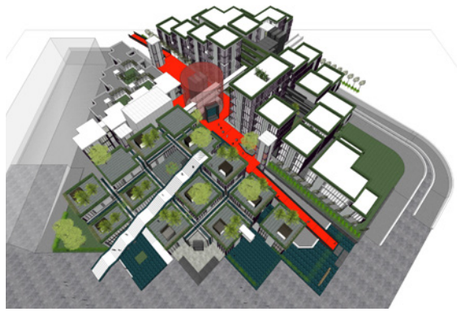
SUBTRACTION
of service core

In order to make a clear zoning and friend public entrance to this multi-function complex, this existing service core will be transform to a semi outdoor space to create more extrovert building. By subtracting some of universal units out, it helps decrease scale of the building and at the same time improve relationship of this building and urban context.

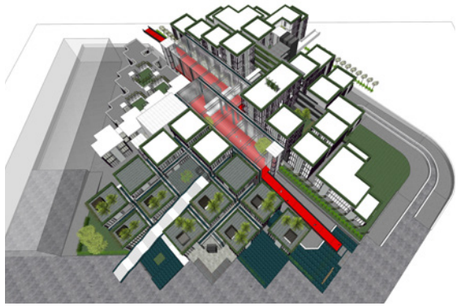


1ST STOREY PLAN
scale 1:500

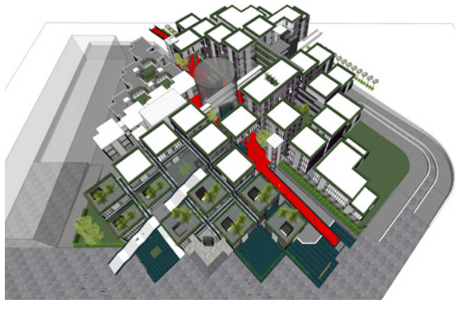
Main street design options
Research by design



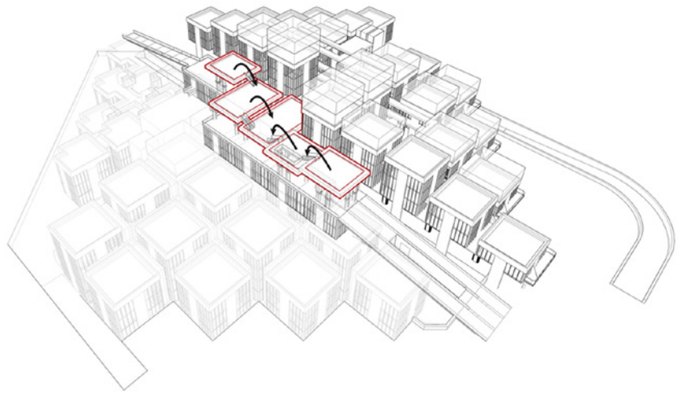
OPTION 1 : Clear cut scheme



OPTION 2 : Glass roof



OPTION 3 : Remain of existing module

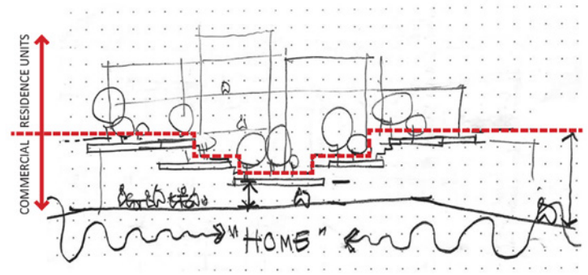


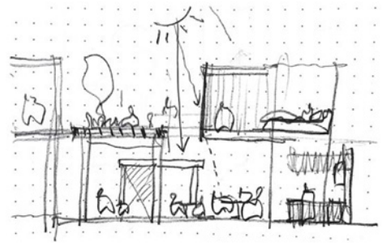
CASCADING CANOPY
of mainstreet

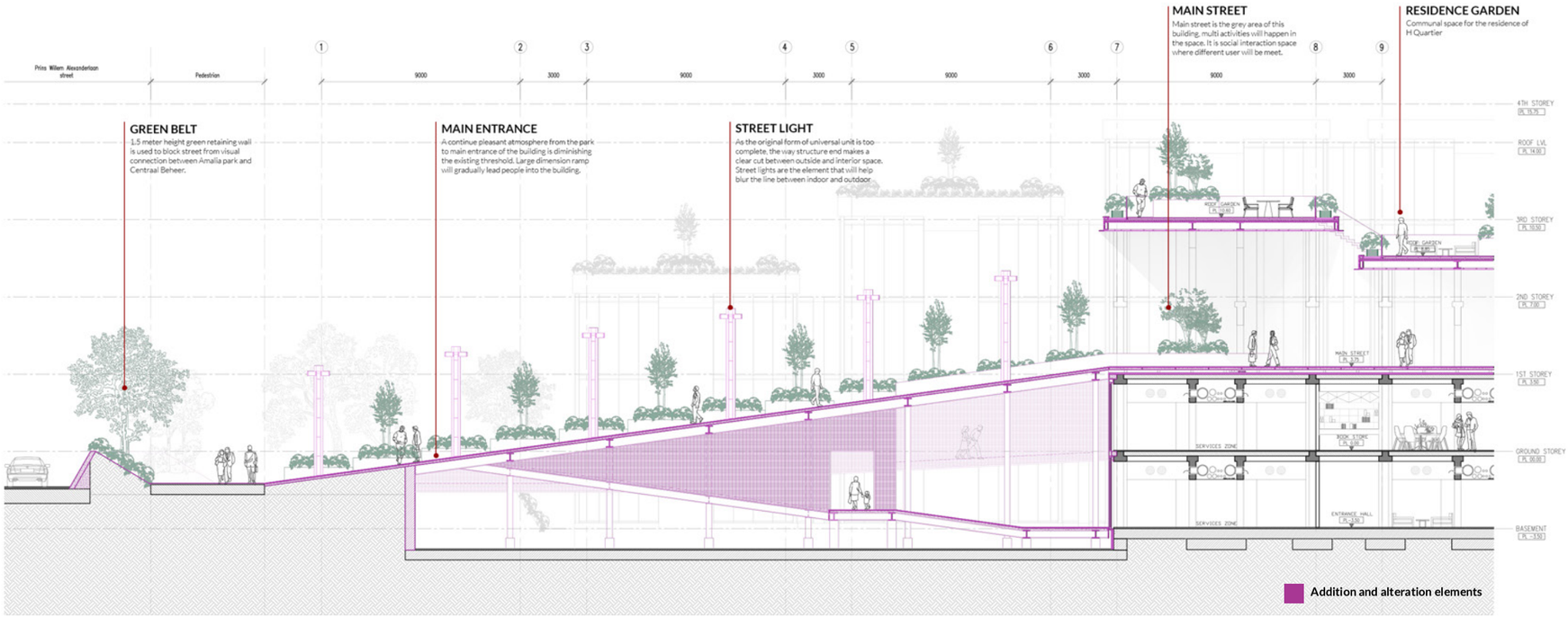
Design language of the original design, box stacking up into a hill shape, is selected to be the design of main street canopy but in the opposite direction. The design of this canopy will turn main street into transition zone leading people from open air outdoor space to the intermediate space before entering different programs.

Option 4 - CASCADING CANOPY
Main street design

Back to the core idea of structuralism movement, human relation is the key philosophy. To create an appropriate entrance, human dimension and human perception should take in to account. The main function of this main street is to lead the user from the entrance to different function in the complex with safe and secure feeling. So cascading roof profile is introduced to this main street area to make it as transitional area, bring user from open outdoor space to intermediate space before distribute to different function. This cascading canopy also is also arousing for social interaction between users.

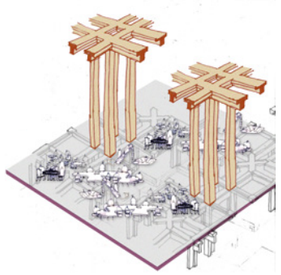






SECTION C-C - Main street
scale 1:250

PERSPECTIVE DIAGRAM SHOW INTENTION OF MAIN STREET



Option 1 : Timber structure

Thinking in term of the use of space, timber would be good material since it will give a warmer feeling to the users.

Option 2 : Steel structure

To have a coherent of design, addition and alteration design will be constructed by light weight steel structure. These thin streel structure, transparent curtain mesh will make this main street to have a light appearance compare to an existing module beside

MAIN STREET CANOPY
Design & construction

For the structure of main street cascading roof, there are 3 different options. These structure has a direct impact on the appearance of development main entrance and main street. So the intention of these area will pay a major role on the decision making as this canopy is to facilitate for the activities that will occur under and above.

The key objective of main street is to be a grey area, combination of circulation space, social interaction space and recreational space. Also it will be the main entrance of this complex. The design should be friendly, welcome, bright and airy.

Option 3 : Existing column

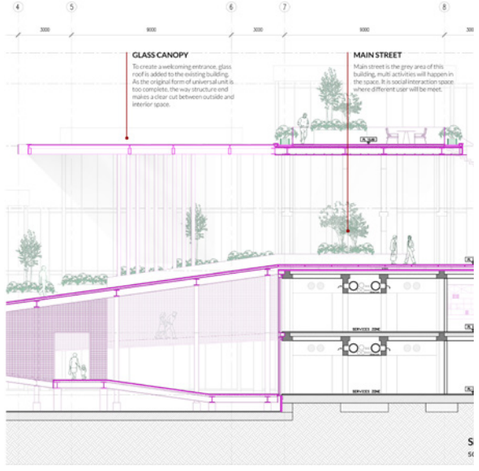
The use of existing column to be a support system for the new roof. By retaining the original column, people will be reminded to the original design of space division and spatial quality.

Option 1 : Glass canopy

Cantilever of glass roof give a sense of receiving entrance. Transparency of the glass turn the space under into semi outdoor space

Option 2 : Timber screen conopy

Selection of timber as material of the canopy make the entrance friendlier. Also casting of shadow through timber screen help to blur the boundary



ADDITIONAL CANOPY

Research by design

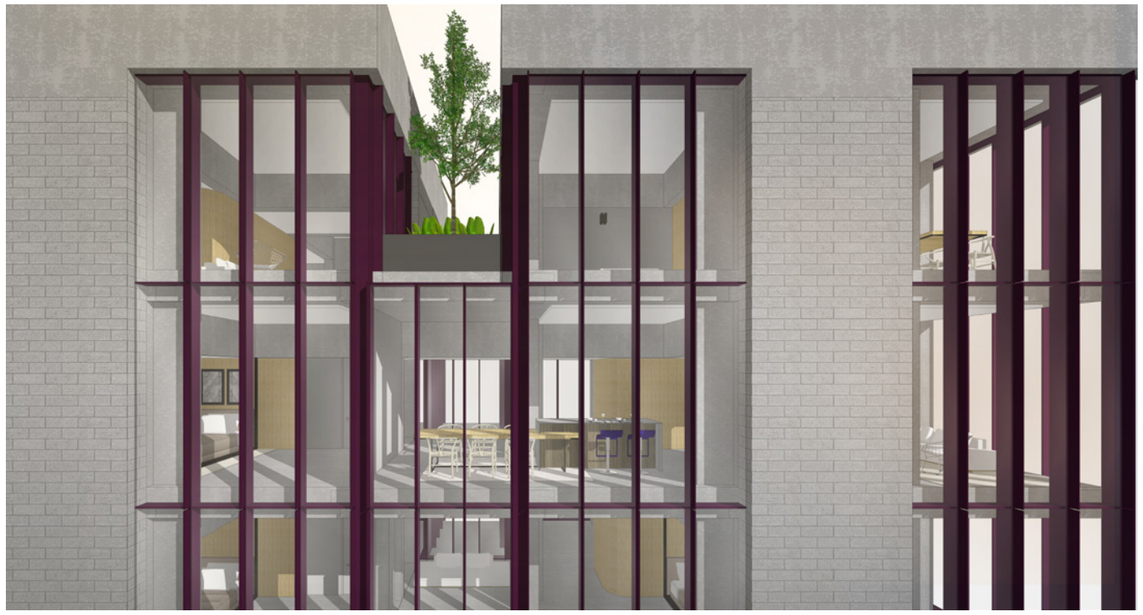
The design of existing universal unit, the roof and column end at the corner, is completely cut the interior and the exterior apart from each other. New canopy/element will be added in the new design to create a smooth connection between the building and urban fabric.

Option 3 : Street light

Instead of creating an additional canopy, putting street light would create the same effect. It can use to be an element to define a space, at the same time leading user to the entrance.

VIEW TOWARD RESIDENCE GARDEN ABOVE MAIN STREET
Main street zone

VIEW TOWARD MAIN STREET
Main street zone

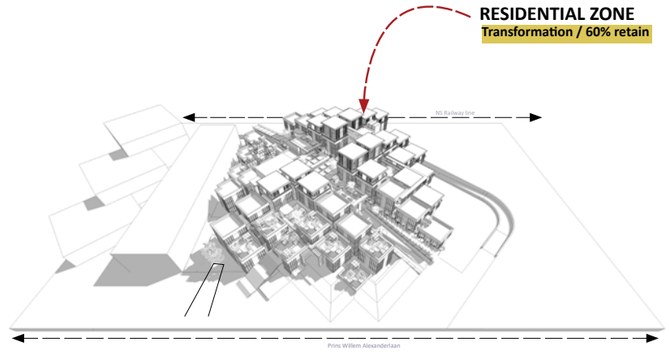


RESIDENTIAL ZONE

Living unit - Communal facilities - Recreational space

The intention of residential development is to continue the idea of individuality and social interaction from Herman Hertzberger. As 'home' is the place where people best express themselves and community is where social interaction takes place. These ideas have major influence on the intervention framework of this development. The architect will only provide an appropriate built environment for living, meaning basic structure for housing development.

Intervention strategy: For the residential function, intervention approach is toward transformation as the requirements for housing is quite different from the original function.

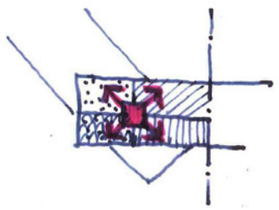


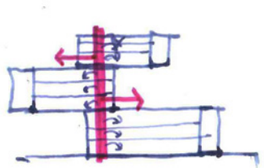
RESIDENTIAL DEVELOPMENT

Precedent studies

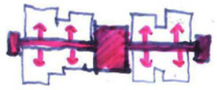
As residential is the main function in the redevelopment of Centraal Beheer, researching on various housing project give practical based data on different aspects such as; what kind of supportive functions the residential development usually has? How to design a boundary between different zoning? How is the vertical and horizontal logistic designed in different projects? This information will formulate a solid starting point and later resulted in a physical appearance of this residential zone of Centraal Beheer.

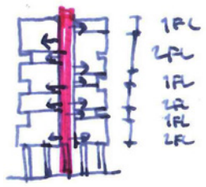
I studied on three residential projects that have similar character as Centraal Beher. But among these projects, it has different design principle, strength and weakness. Looking at these precedents help to create the best solution for Hertzberger Quartier residence.





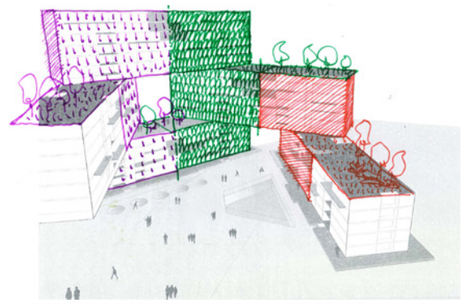
The Interlace, Singapore
architect : OMA



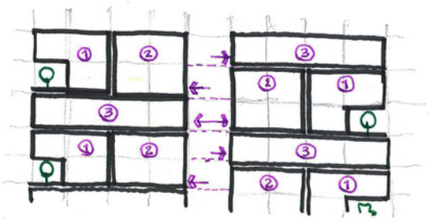


The Colonnade, Singapore
architect : Paul Rudolph

Habitat67, Canada
architect : Moshe Safdie



The Interlace, Singapore
architect : OMA



The Colonnade, Singapore
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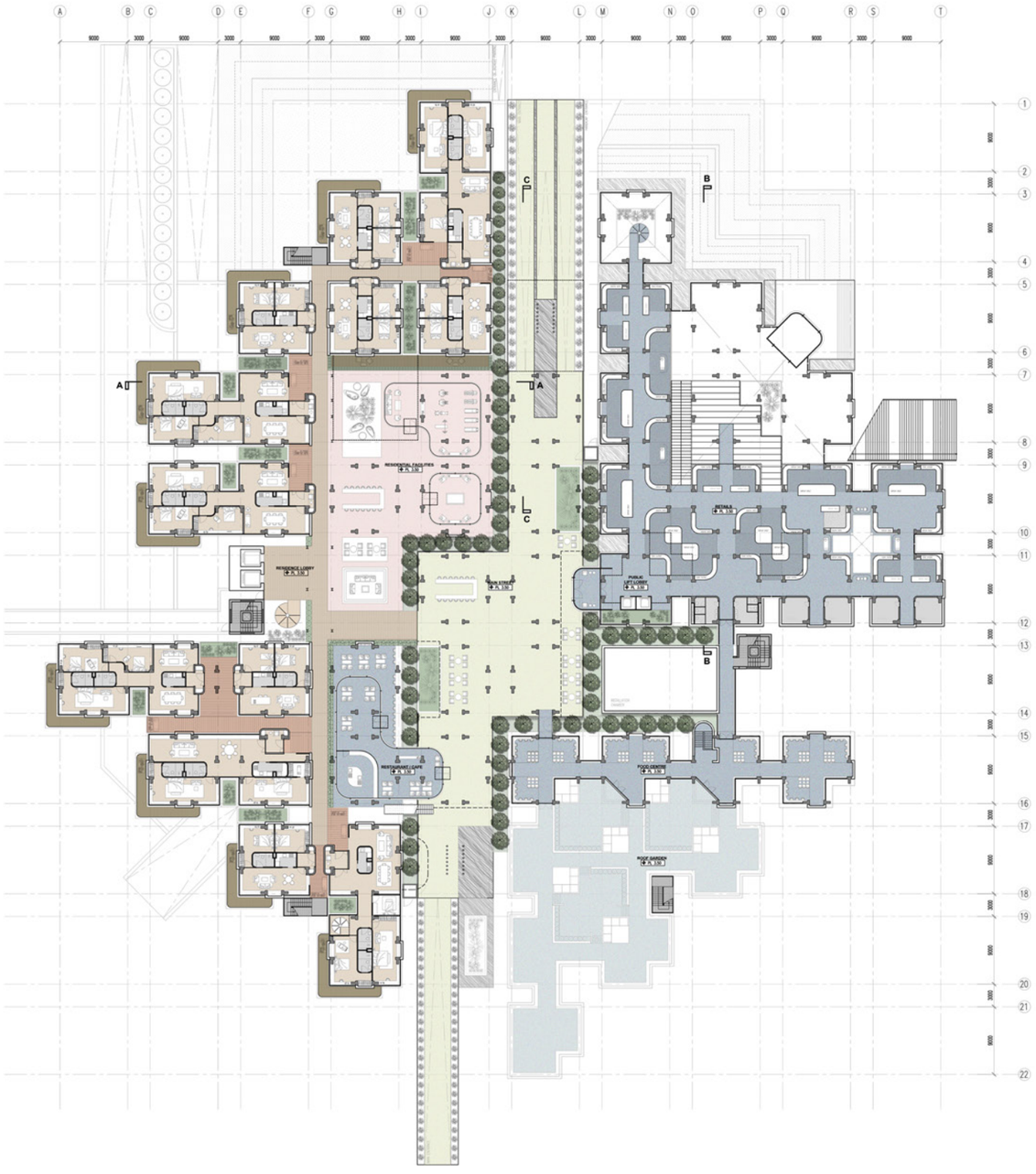


N

1ST STOREY PLAN
scale 1:500

FRAMEWORK OF TRANSFORMATION

Office function to residential development

The following elements will be provided by architects to transform existing building to be a comfortable living community

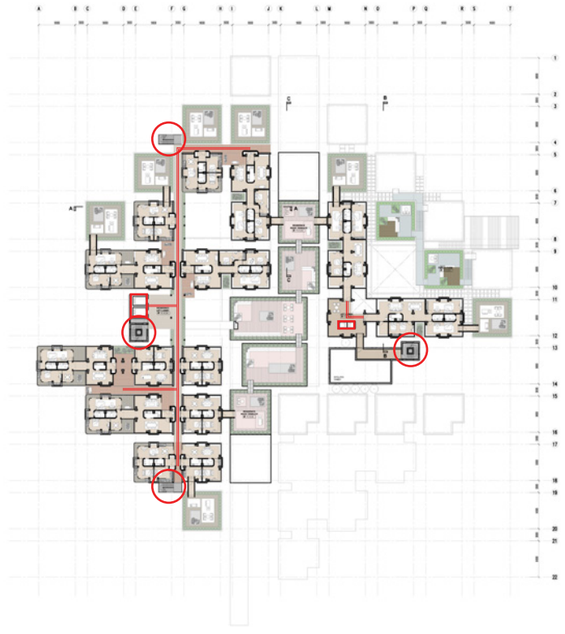
1. Logistic system
Following the unit arrangement, single vertical core and main corridor leading to apartment unit is the most efficient, at the same time corresponded to the design of inner street by Herman Hertzberger. This walkway will be socializing space where people meet before go down to the main communal facilities.

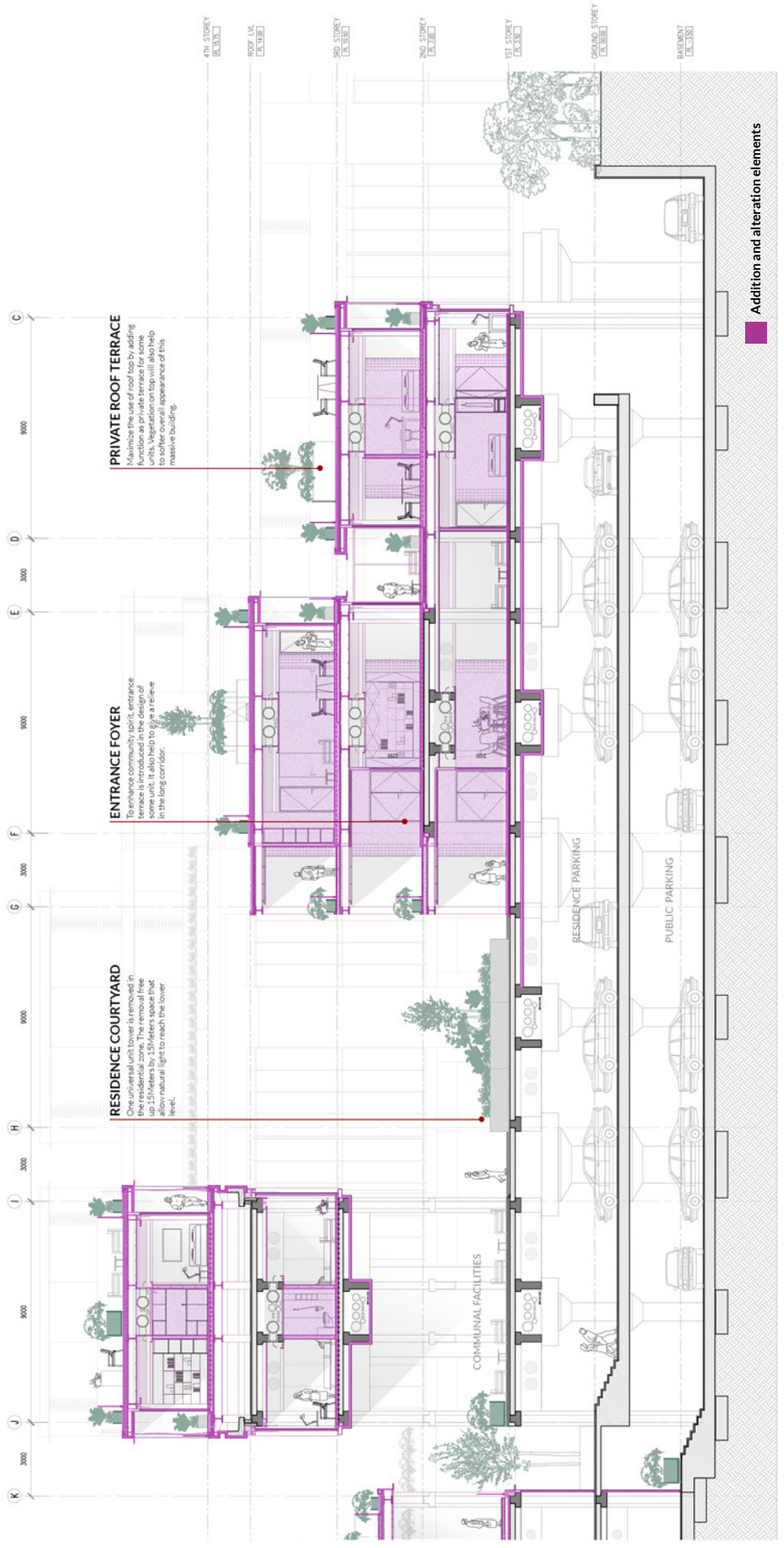
2. Safety
Extra fire protection system including fire staircase, fire resistance material are added in the design to complie with the Ductch regulation

3. Built environments

communal facilities
These spaces are extremely important in the creation of community spirit in the development.

units arrangement
during the planning process of this zone, quality of apartment units is the main priority. Minimum standard for high-quality of living need to be achieved. The standard is including unit facing external view, sufficient natural ventilation and daylight. These requirements have major influence on the layout of this zone.

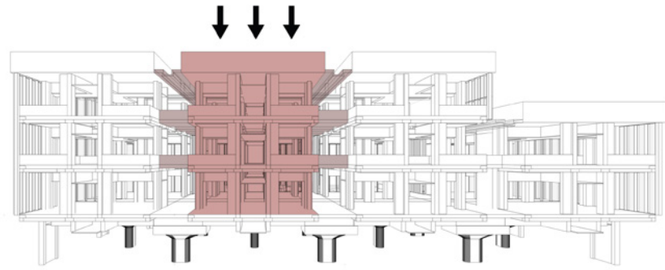




SECTION A-A - Residential zone
scale 1:250

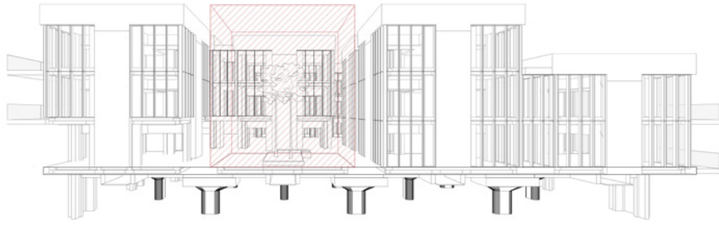
SPACE FOR LIVING
Design process

Creation of high quality built environment for living is one of the major goal in this residential quadrants. Requirement of space for the original function and proposed function is quite different. The original design of Centraal Beheer is a massive block with the continuous interior space, façade is at the building periphery. The quality of space in this existing building became a challenge for residential development. For living space, daylight and ventilation is extremely important, porous building is required in this case.



SPACE FOR OFFICE FUNCTION

One big continuous interior space was design for office space. Natural light penetrates through the building by glazing window around building parameter, and by skylight above inner street.



SPACE FOR HOUSING

Subtraction of one universal tower can turn massive building to be a porous space. By removing 15x15 meters, natural light can reach the lower level of this zone which also improve the quality of each universal unit.

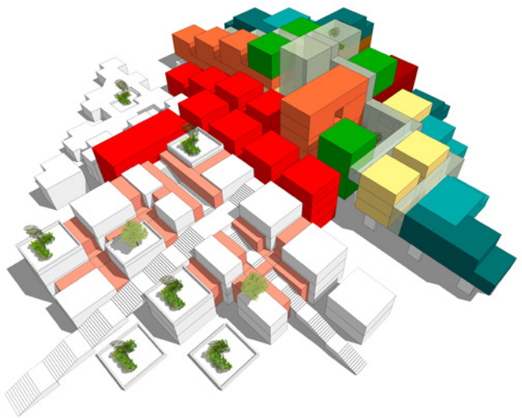
VIEW TOWARD RESIDENCE COURTYARD
Residential zone

UNIT ARRANGEMENT

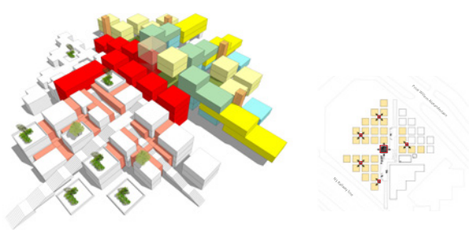
Design process

In residential development, logistic system is very important. Through the study of precedent project, there are two main logistic systems; one is main core with corridor leading to each apartment unit; another one is individual core serve limited number of unit per one lift.

From these two system of transporting user to individual unit, I experiment with design option on Centraal Beheer both in 2 dimensional and 3 dimensional. By concerning the design philosophy of structuralism architecture on social interaction and unit arrangement, main vertical core and corridor is the suitable option.



Option 1 : Main vertical core & corridor



Option 2 : Individual vertical core

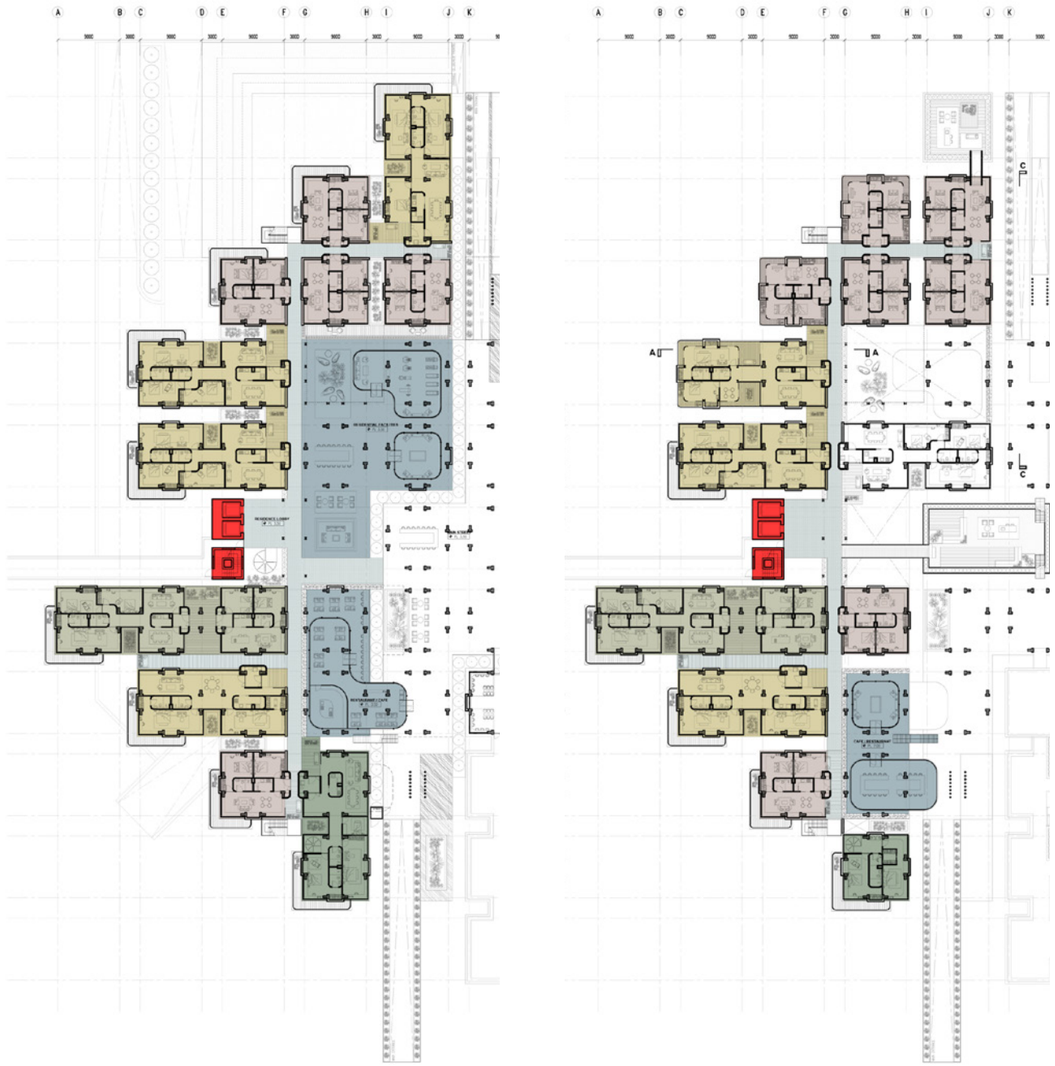
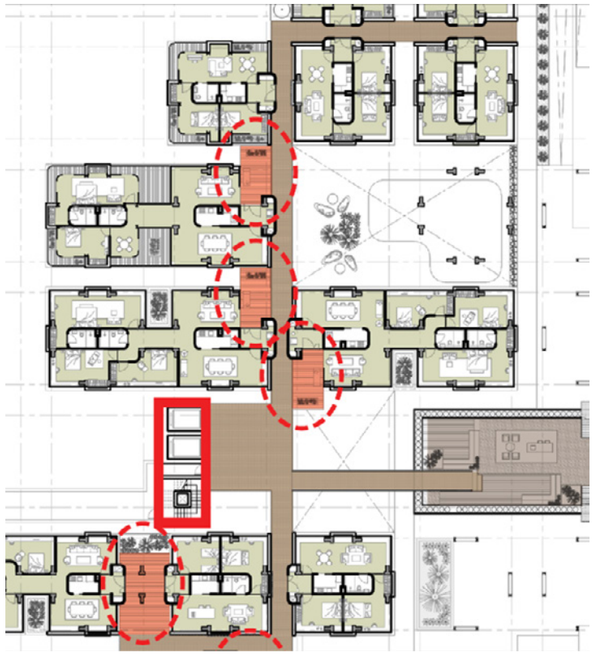


DIAGRAM OF APARTMENT UNIT ARRANGEMENT

COMMUNITY SPIRIT
Corridor design

Sense of community is one of the key objective in this redevelopment. Provision of spaces for kids to play together, elderly users to gather is integrated in the design. Various designs technique of other structuralism architecture related to residential development are studied and adapted to the new development.

Communal facilities are located in different level, the main one are on 1st storey and above main street canopy. Along the main corridor, entrance terrace of some unit will break the long walking distance while stimulate for social interaction between neighbor in the same level.



RESIDENCE UNITS

Total 46 units 6000 sqm

Ⓐ Standard:

1 UNIT, 85 SQM25 UNITS
(studio - 2 bedrooms)

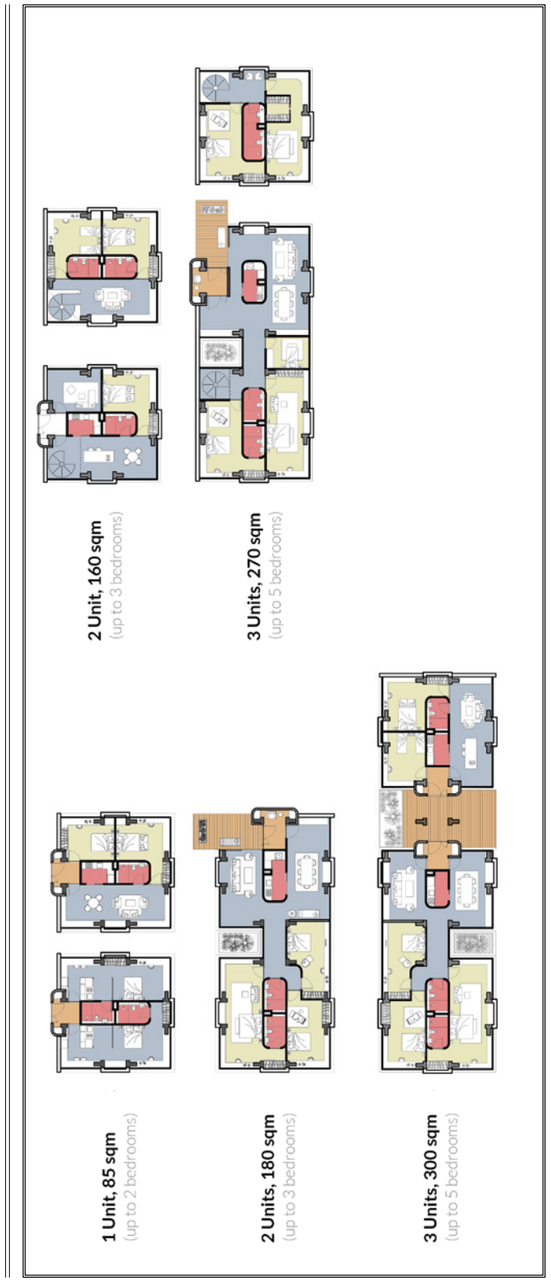
2 UNITS, 180 SQM 12 UNITS
(up to 3 bedrooms)

3 UNITS, 300 SQM 3 UNITS
(up to 5 bedrooms)

Ⓑ Duplex:

2 UNITS, 160 SQM 4 UNITS
(up to 3 bedrooms)

3 UNITS, 270 SQM 2 UNITS
(up to 5 bedrooms)



APARTMENT UNIT

Design strategy

As residential is the best function to represent structuralism idea of 'individuality', the idea of competence and performance will be implemented in all level of residential zone. For the residence unit, certain level of framework to achieve high living quality will be provided by architect.
Through the process of designing the apartment units, various limitations are tested. Start from the most extreme option, which the architect design every physical element start from room division to the selection of finishes. For the final design for the apartment, the architect just provides all the essential element for living, give the freedom to individual user to interpret with their own preference.

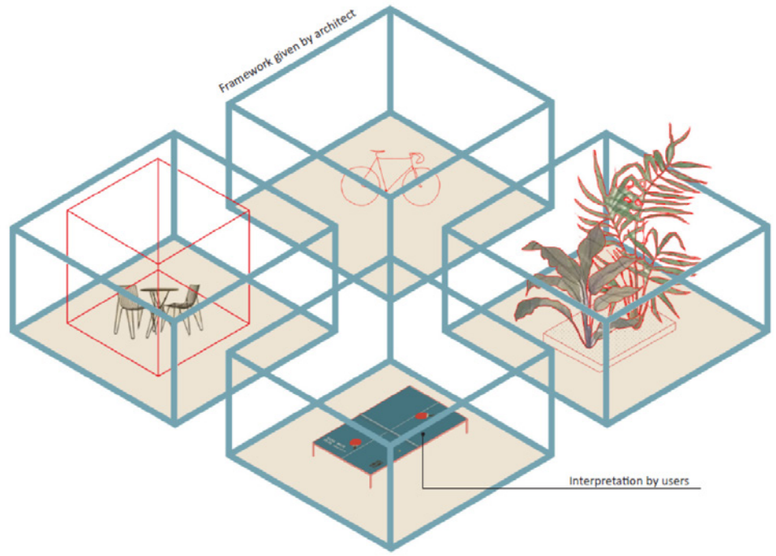
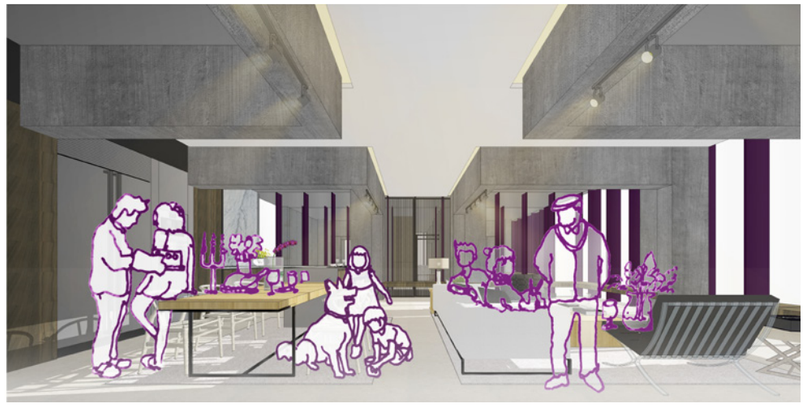


Diagram of Competence & Performance
Herman Hertzberger believe that ' the user is his co-designer'. The main architect provide basic elements; support system ;overall design composition ;competence, then the user will complete the space with their own personal taste (Luchinger, 1987)

INITIAL DESIGN IDEA
Apartment layout

An initial design intention for the apartment is to retain every qualities of existing universal module. Layout of an apartment will be completely design by the architect. The basic principle for planning is regarding natural light, ventilation and privacy. Apart from that the idea of open plan and flexibility of space in structuralism movement also have major influence on the initial design. Living and dining space will be the main area of each apartment, to enhance the idea of social interaction, all the bedroom will be placed in the most private corner of the unit.
However, providing all the layout to the user is contrast with one of structuralism core idea 'individually'. Each user should have a freedom to interpret the apartment with their own preference.

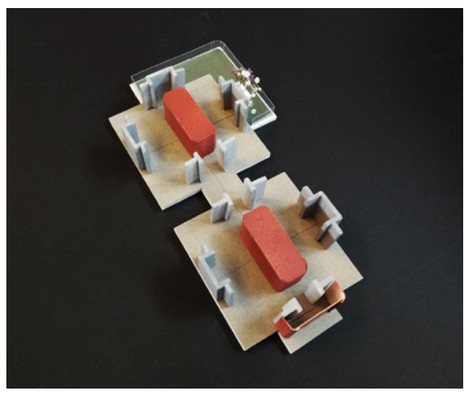


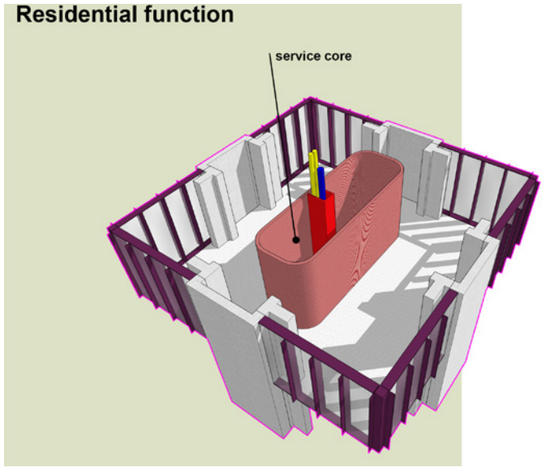
FUNDAMENTAL ELEMENTS
essential for living unit

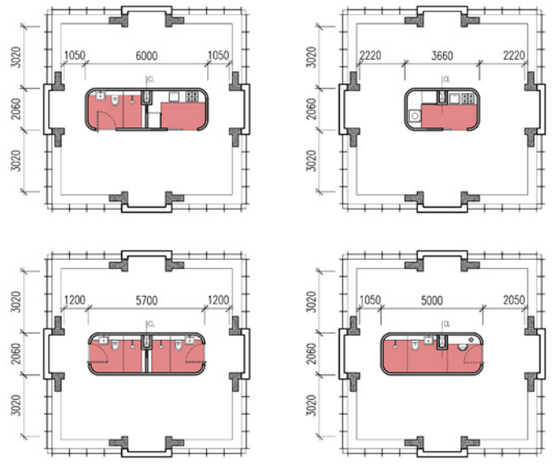
Following structuralism design philosophy, only essential framework for housing will be added to the extant built fabric. These element is related to different aspects range from planning to technical requirement.

Service core: an essential area in residential unit apart from living space is service zone. This area need both vertical and horizontal connection. The most logic service system in vertical housing is to place this service shaft at the same location of every floor. In the case of Centraal Beheer, it is located in the centre of universal units. This unit can house various functions both living and services. Adding this box in the middle help to divide an appropriate space for housing function.

Entrance hall: one of the important element in Dutch housing is the entrance reception. This hall will be transitional zone between exterior and interior which also help to prevent the strong wind entering living space. different in time of the two designs.





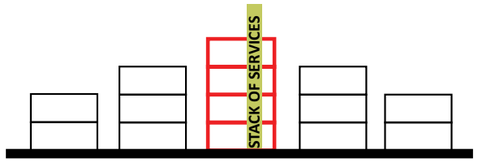


SERVICES CORE

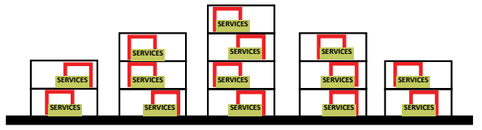
Additional element

To transform office space to be a suitable place for living, additional services core is one of the key element. It will be a prefabricated module to be filled in every universal unit. Dimension of these core will be standardizing to four different sizes for various room layout, still vertical shaft will remain in the same location.

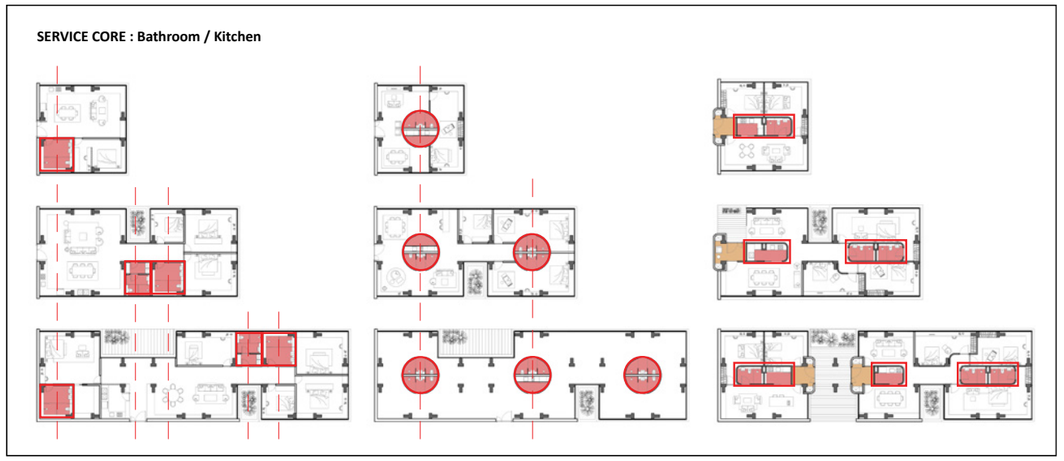
Adding service core to each apartment unit help to solve technical issue on all service routing. From architectural point of view, this boxes help to divide an appropriate dimension for living and give a flexibility for interpretation by user.



OFFICE FUNCTION

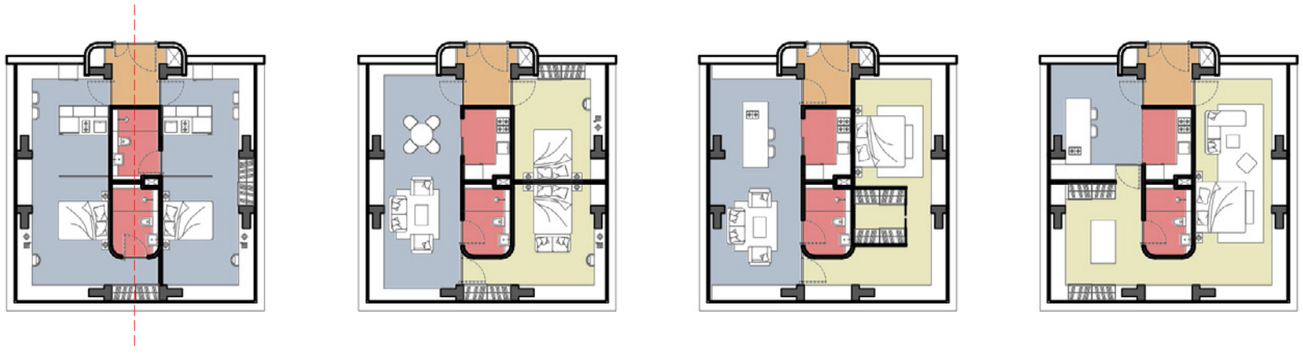


RESIDENTIAL FUNCTION



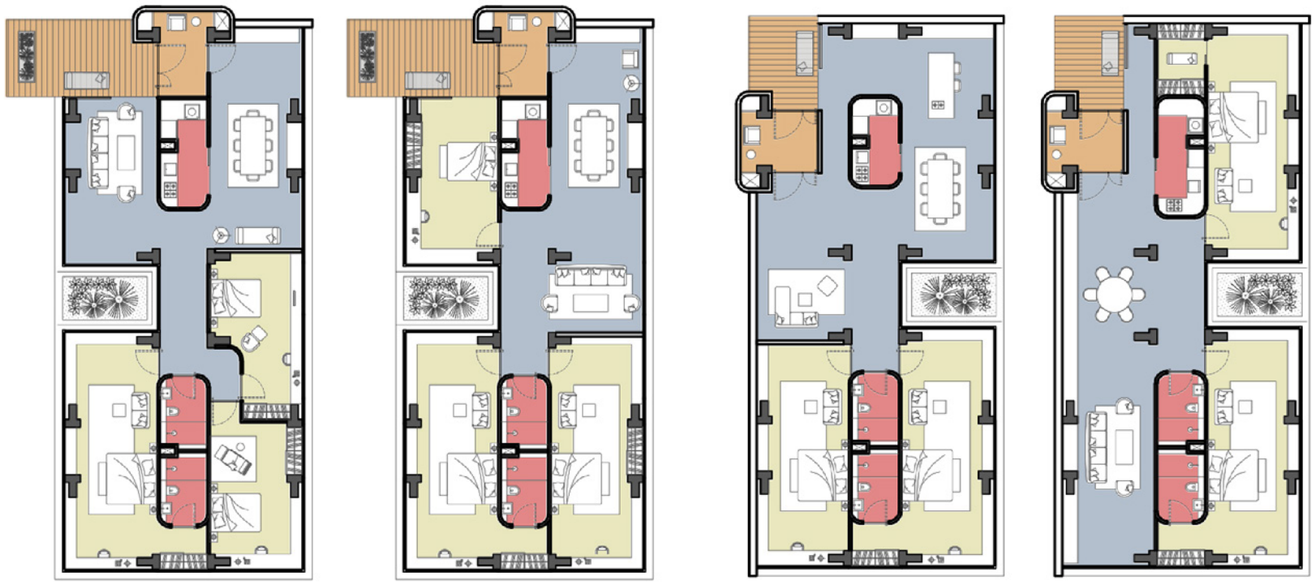
ROOM LAYOUT VARIATIONS

1 unit- Standard



ROOM LAYOUT VARIATIONS

2 unit- Standard



VIEW OF RESIDENIAL APARTMENT (EXISITNG MODULE)
Residential zone

VIEW OF RESIDENIAL APARTMENT (NEW MODULE)
Residential zone

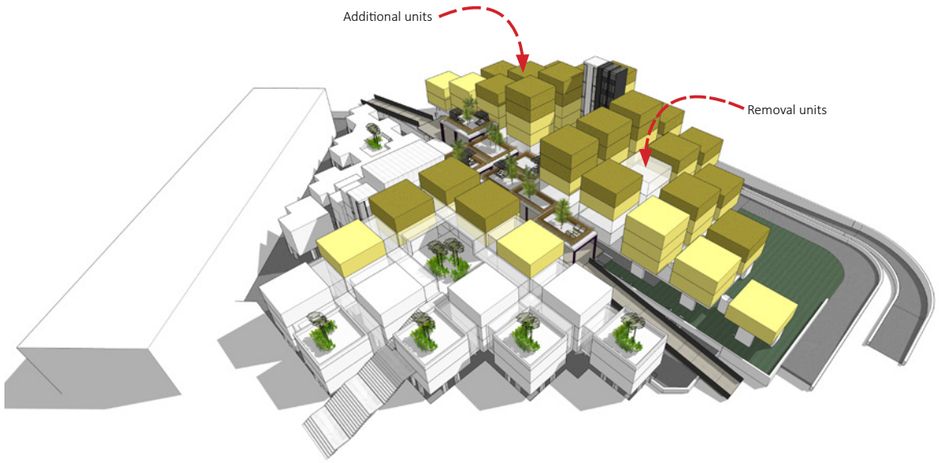
PROGRAM & DESIGN
ambition of public function

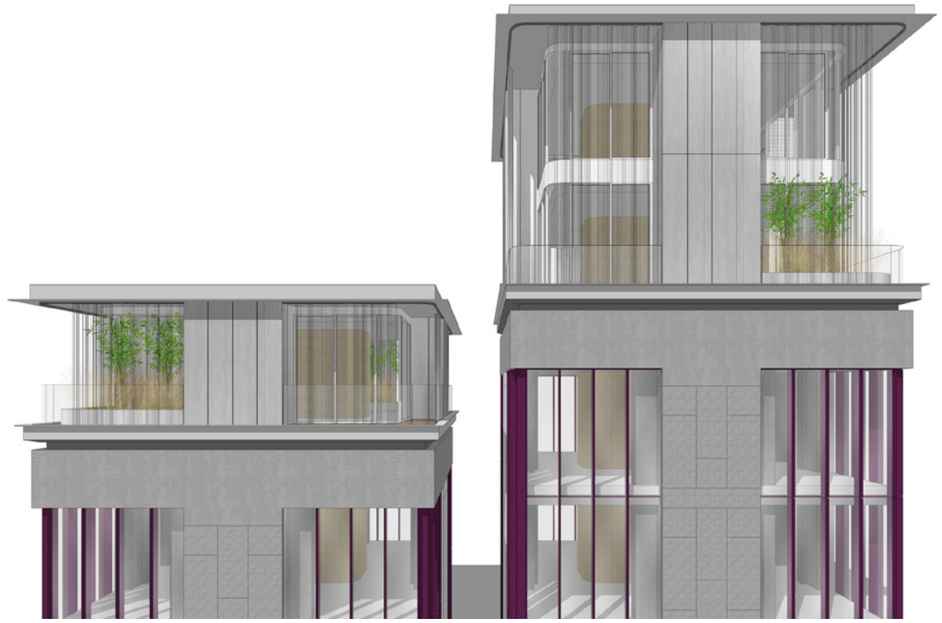
Design goal for the new module is to create an intimate appearance for housing function while retaining original design language. Composition of solid and transparent wall is essential to be maintained in order to preserve overall look of Centraal Beheer icon of structuralism.

Composition: According to the high value of existing façade composition, as it gives the idea of space division inside which come from human relation, new module will duplicate this design language to tire the old and the new together. Modern construction technique of thin slab and sharp edge will give the different in time of the two designs.

Layout design: Structural grid line is offset in by 600MM to create in between space. This balcony will be transition zone from outdoor to indoor space. It will also help to improve quality of interior space as plants can be grow in this area. In term of building technology, these canopy will also block direct sunlight during summer time.

Materials: Selection of material will indicate the different in time of construction and also program in the units. In this residential zone, full-height transparent window is selected to maximize daylight coming in. Neutral texture and light color will be used to create an appropriate atmosphere for living. Curtain mesh will be provided outside for the users to define their own level of privacy.



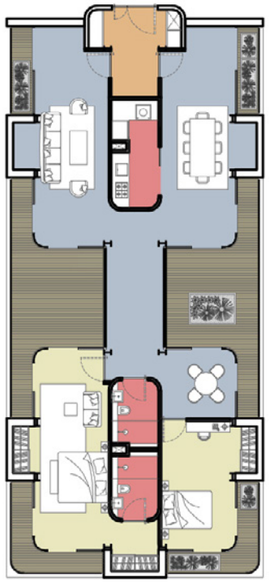


Design experimental for extension

Various design options of extension module are experimented for the most appropriate result. Each design options take different factor and ingredient from the design of existing module

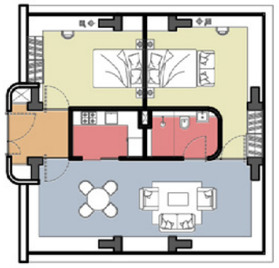
NEW MODULE

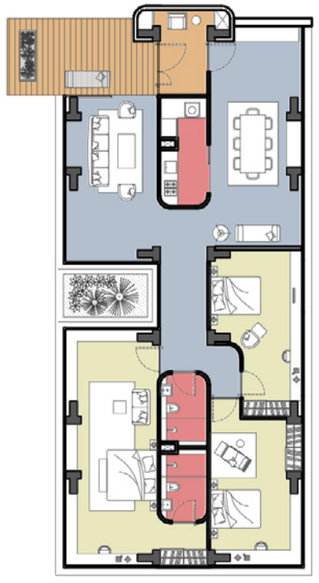
1 & 2 units - Standard



EXISTING MODULE

1 & 2 units - Standard

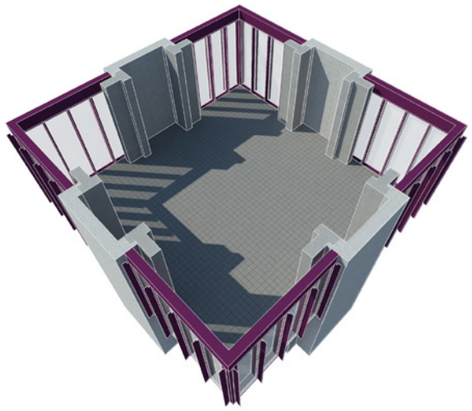




The overall appearance of material selection of the existing module and the new module is similar in term of color. Once zoom in to the detail and textures, the proposed new materials will provide a warmer and softer touch to the space. Rounded corner, soft reflection, transparency, these material properties will transform neutral space to be a living space.

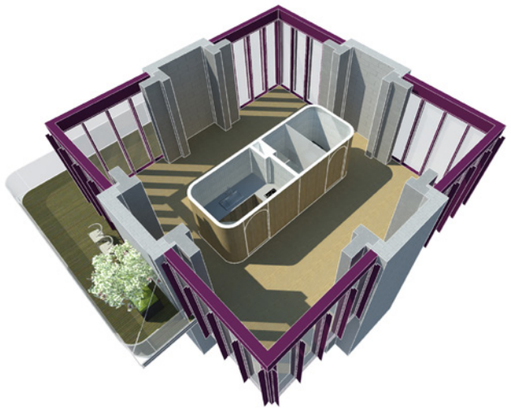
UNIVERSAL UNIT
Interpretation of existing module

The existing module, Herman Hertzberger design for an office function, has transform differently to make a proper design for the new function. However, any alteration or addition design element will be framed by existing quality, both physical and design ideas. In Hertzberger Quartier, there are two main functions; one is residential; another is retail. The design of module in retail part remain the same while residential need a warmer appearance, so the existing module will be modified.



EXISTING MODULE
Retail zone

The original design of universal unit by Herman Hertzberger is intended to be honest. Exposed concrete structure, concrete block gives a rough finish that is aroused for individual interpretation. Street tile is used as floor materials to give external atmosphere. Aluminum framed window is selected due to its function.



EXISTING MODULE - MODIFY
Residential unit

For residential unit, internal atmosphere will be modifying to have a warming and softer appearance. Still most of existing elements and composition will be kept to be as a remnant of original unit design. Timber finished will be used for additional elements, as service box and radiant floor. Balcony will be adding to these residential units, offer resident in between space.

NEW MODULE
Residential unit

In the new module, structural composition will be at the same location. Material selection principle is similar to the principle of Herman Hertzberger. Color and texture will be neutral to arouse for user interpretation but at the same time give warm feeling. Curve edge is used as the typical design language to soften the atmosphere and light coming through.

VIEW TOWARD RESIDENTIAL ZONE
Residential zone

RETAIL ZONE

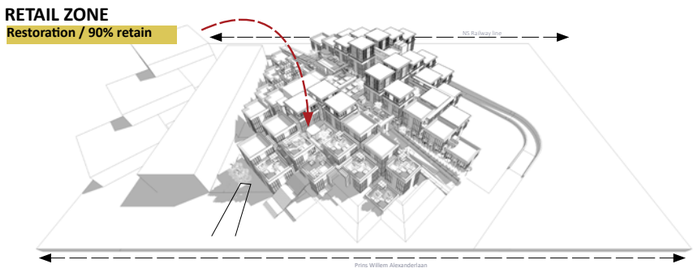
Daily functions – Department store – Public recreational

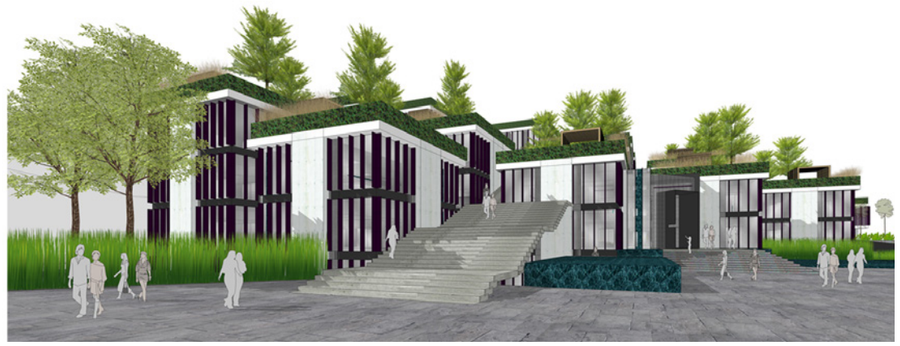
This commercial zone of the development will house various public facilities. Daily function for basic need such as food, market, pharmacy and education will be provided to serve Hertzberger Quartier residence, neighborhood and users of surrounding building.

Intervention strategy: In this quadrants is toward restoration approach, since the existing spatial qualities such as big open floor plan, vertical and horizontal connection are already suitable for retail store.

RETAIL ZONE

Restoration / 90% retain



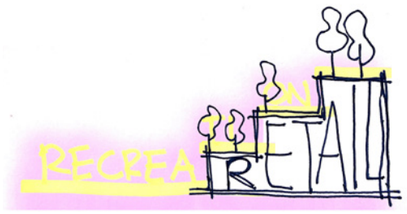


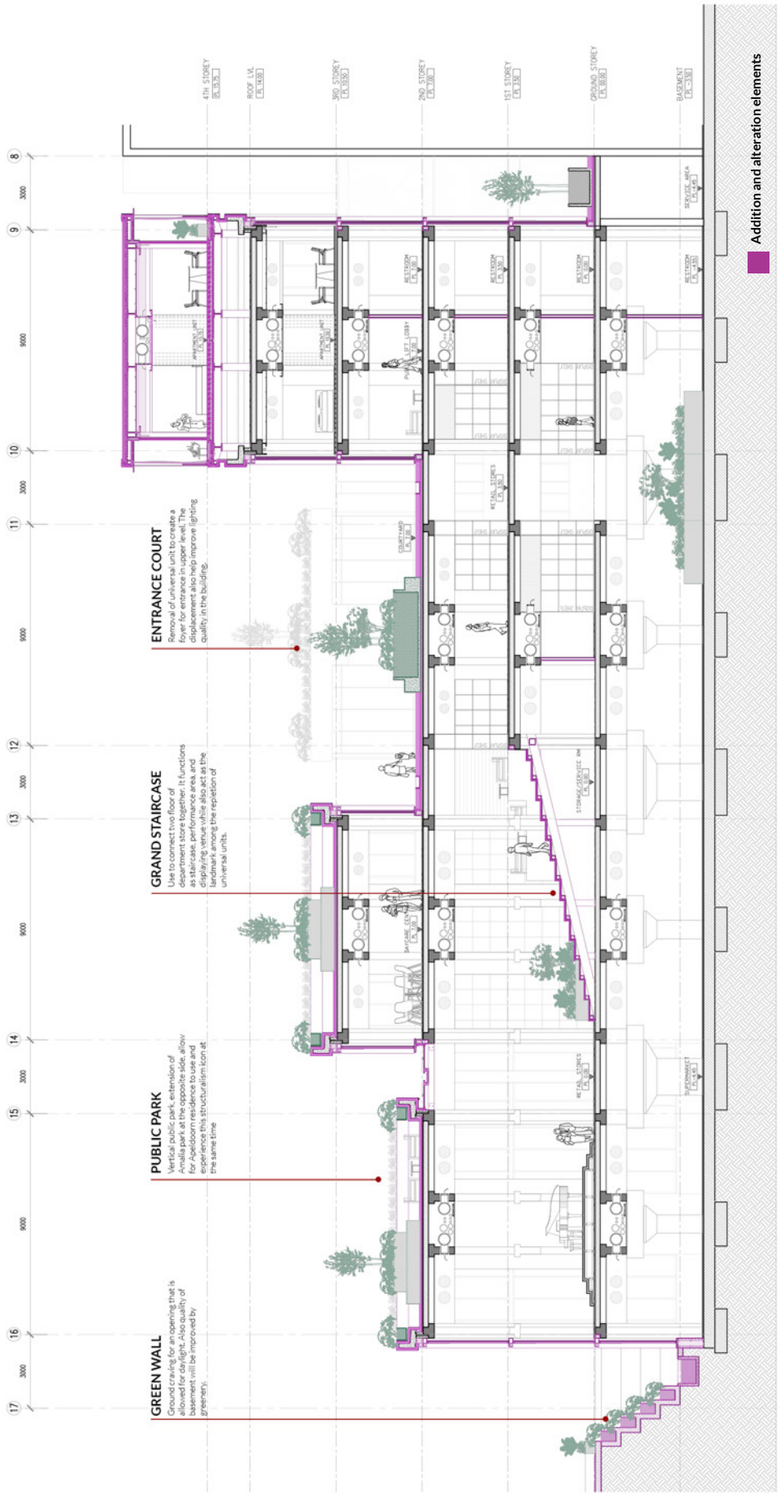
PROGRAM & DESIGN
ambition of public function

The ambition of this redevelopment is not only limited to the transformation of architecture itself, but also the impact on wider context. It is crucial to improve relationship of this building and urban context to endorse the life of this structuralism icon. It can be done through both physical and functional connection.

This retail zone is one of the major key in the new development to connect Hertzberger Quartier to urban tissue. First connect is provided by the function contained in this quadrants

Vertical public park located on top of each tower helps to physically merge Centraal Beheer building to urban context. As it is connecting this development with the inner city of Apeldoorn by using extant urban facility, Amalia park at the opposite side, it forms the new landmark of Apeldoorn city.





SECTION B-B - Retail zone
scale 1:250

FUNCTION ARRANGMENT
accessibility

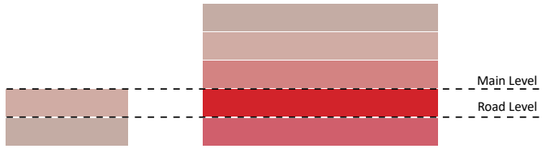
Function arrangement in this area is follow public accessibility level, the most public function as department store will be located on ground and main floor of the development. More private function as daycare centre and medical clinic will be positioned on the upper level. New entrance next to the main street is provided for direct assess. Outdoor staircase also added to improve accessibility of the upper level.

There are three major interventions in this retail zone;

Grand staircase: New staircase is added in the department store, to connection the two floor together, at the same time it will act as a landmark for this zone.

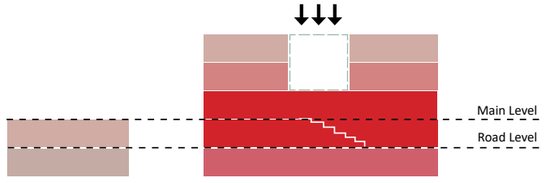
Creation of entrance court: One universal unit is removed in this wing, to create an entrance hall for function in upper level. This intervention helps to improve accessibility level and also improve quality of interior space for these upper unit

Opening to basement: The opening around the building parameter to bring natural light down to basement level, green wall and water feature will help to improve spatial quality of basement.



EXISTING ACCESSIBILITY LEVEL

Gradient of accessibility is start from the main entrance in road level

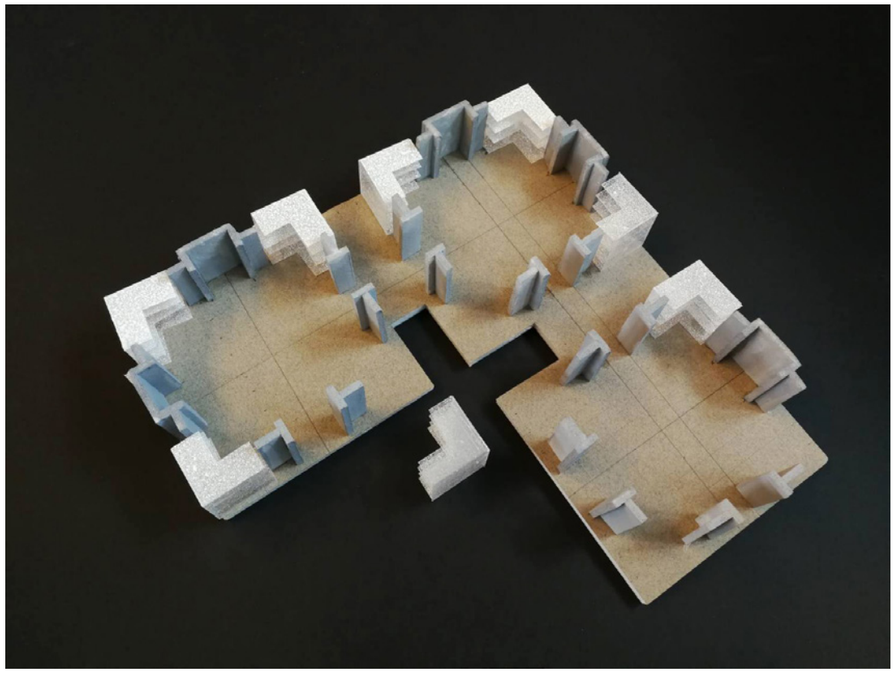


SUBTRACTION & CONNECTION

To improve accessibility level to retail zone, grand staircase is introduced to connect different level. Removal of unit to create entrance hall for upper level

VIEW TOWARD ENTRANCE HALL ON UPPER LEVEL
Retail zone

VIEW TOWARD GRAND STAIRCASE
Retail zone

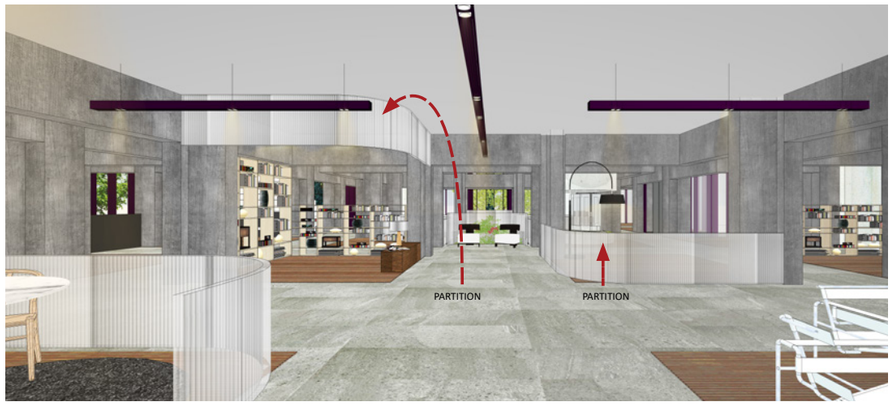


SPACE DIVISION

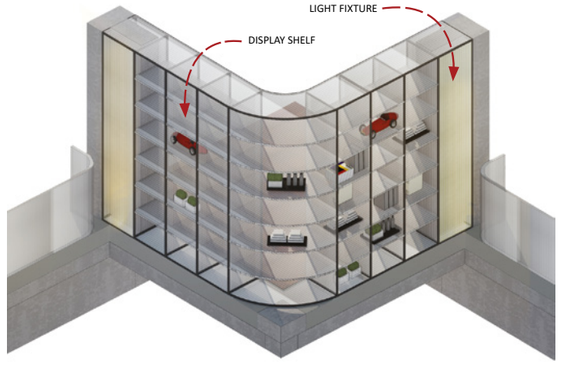
Interior design of department store

As the main intervention strategy for retail zone is restoration, all interior qualities such as space division strategy, use of material, exposed of structure will be preserve. In the initial design of retail store, the idea of space division by using partition wall, different ceiling height is implemented.

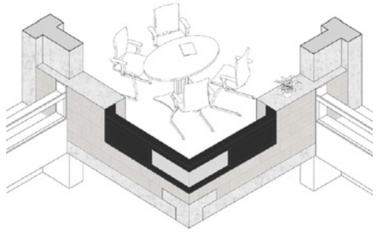
For the final option, to convert office space to be retail store, existing table height timber cabinetry used for storage, table, railing will be replaced by prefabricated light weight full height shelve to be used as different functions. It can be used to displays goods, as partition, as light fixture, as table.



Perspective show initial idea of space division in retail stores



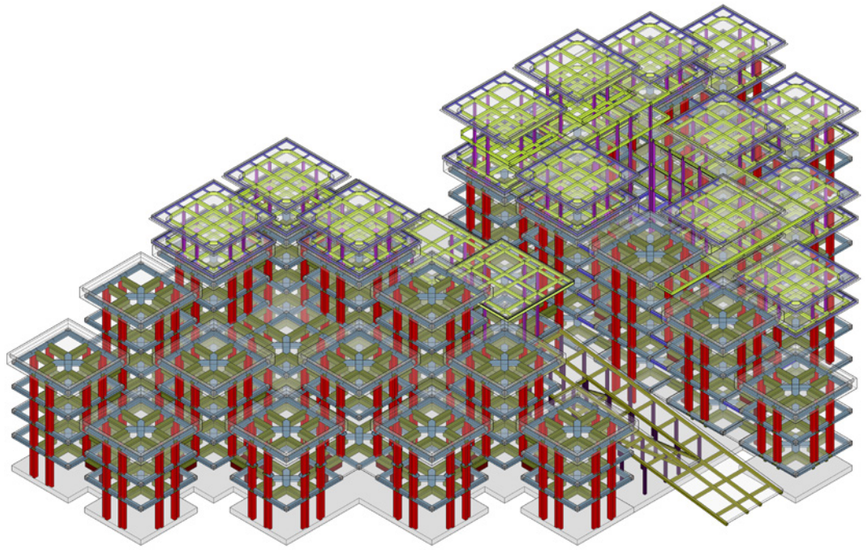
RETAIL FUNCTION



OFFICE FUNCTION

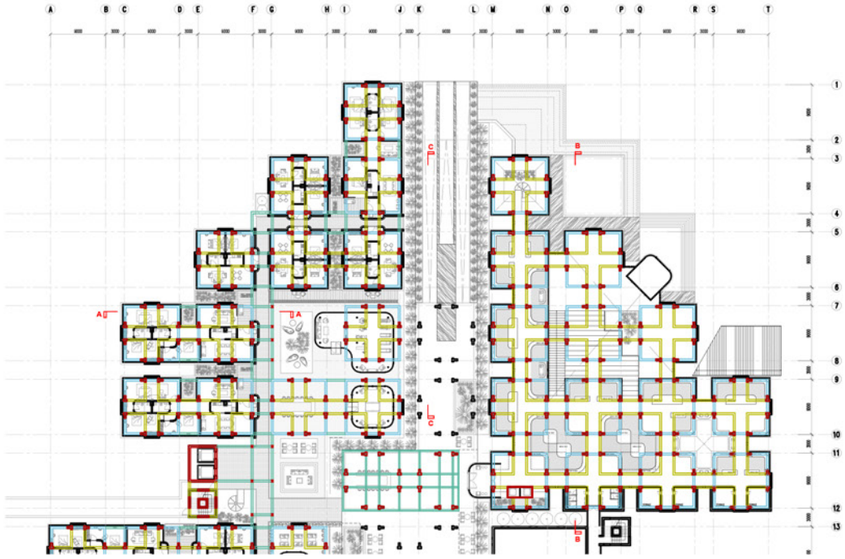
VIEW TOWARD RETAIL STORES
Retail zone

VIEW TOWARD CAFE AREA
Retail zone



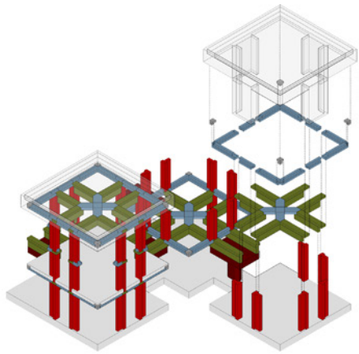
CONSTRUCTION & BUILDING TECHNOLOGY

One of the aspects in heritage and architecture triangle is 'Technical issue'. In any intervention, it is every essential to understand the challenges of extant built fabric and study on various possibilities to achieve the best solution for the other aspect.

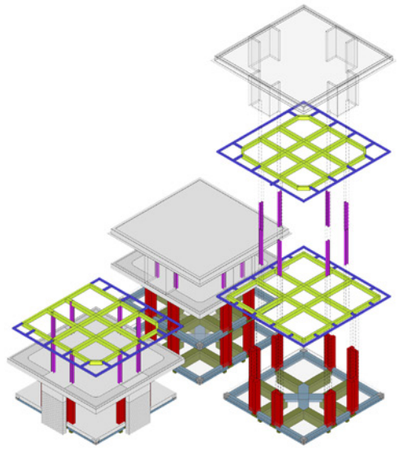


1ST STOREY - STRUCTURE
scale 1 : 1000

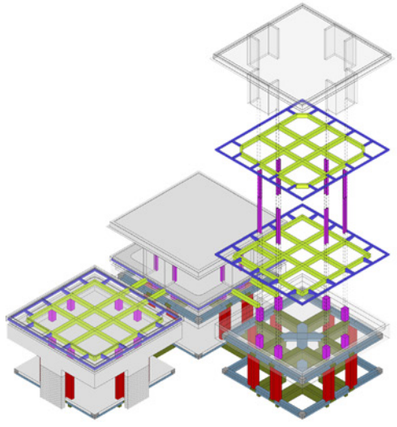
2ND STOREY - STRUCTURE
scale 1 : 1000



Existing prefabricated structure
structure exploded diagram



Existing modify & addition
structure exploded diagram

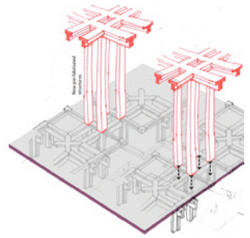


Additional structure
structure exploded diagram

STRUCTURAL CONCEPT

Construction technique

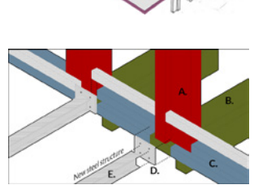
For the redevelopment of Centraal Beheer, there are addition and alteration elements throughout the building which need a new support system. The original skeleton of this building is prefabricated concrete structure, constructed module by module, any additional support will be constructed by light weight steel structure. From the over view of structural diagram, there are three main construction technique; original concrete structure; original column and new steel beam; total new structure.



New structure

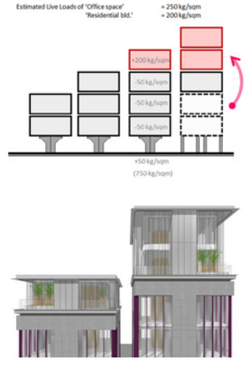
Material - Steel structure will be used for any addition and alteration part of Centraal Beheer redevelopment. Light weight structure is the chosen system for construction in extant built fabric regarding workability issue, working space, mobility, etc.

Principle - New set of structure will be placed directly on top of existing column to have direct load transfer to the ground



Typical connction - The most typical details are connection between concrete structure and steel beam.

A. Exising column
B. Primary structural beam
C. Secondary structural beam
D. GS flat plate with thermal break
E. Steel beam dimension to spec.

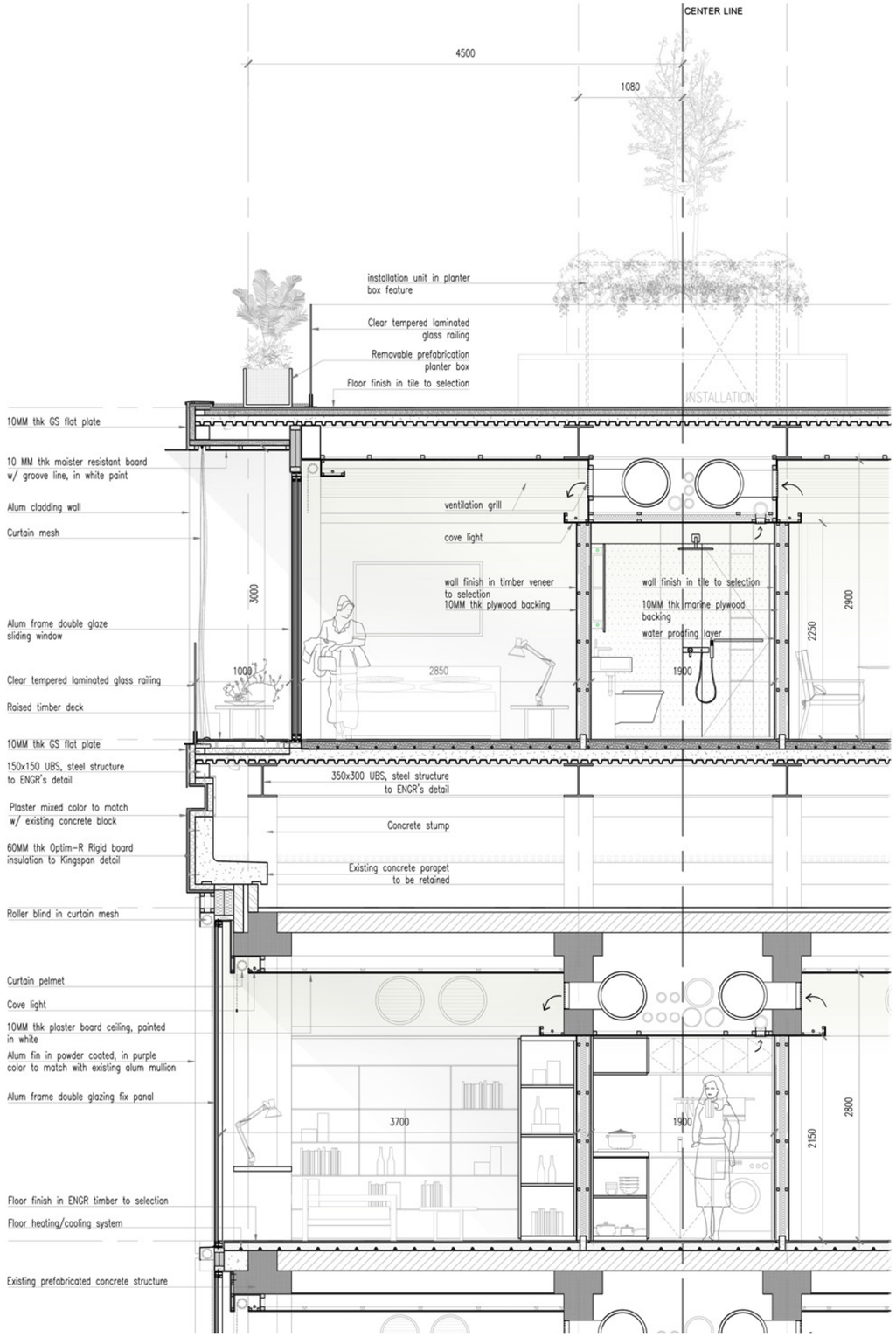


Additional units

There are two principles for additional unit in Centraal Beheer structure system

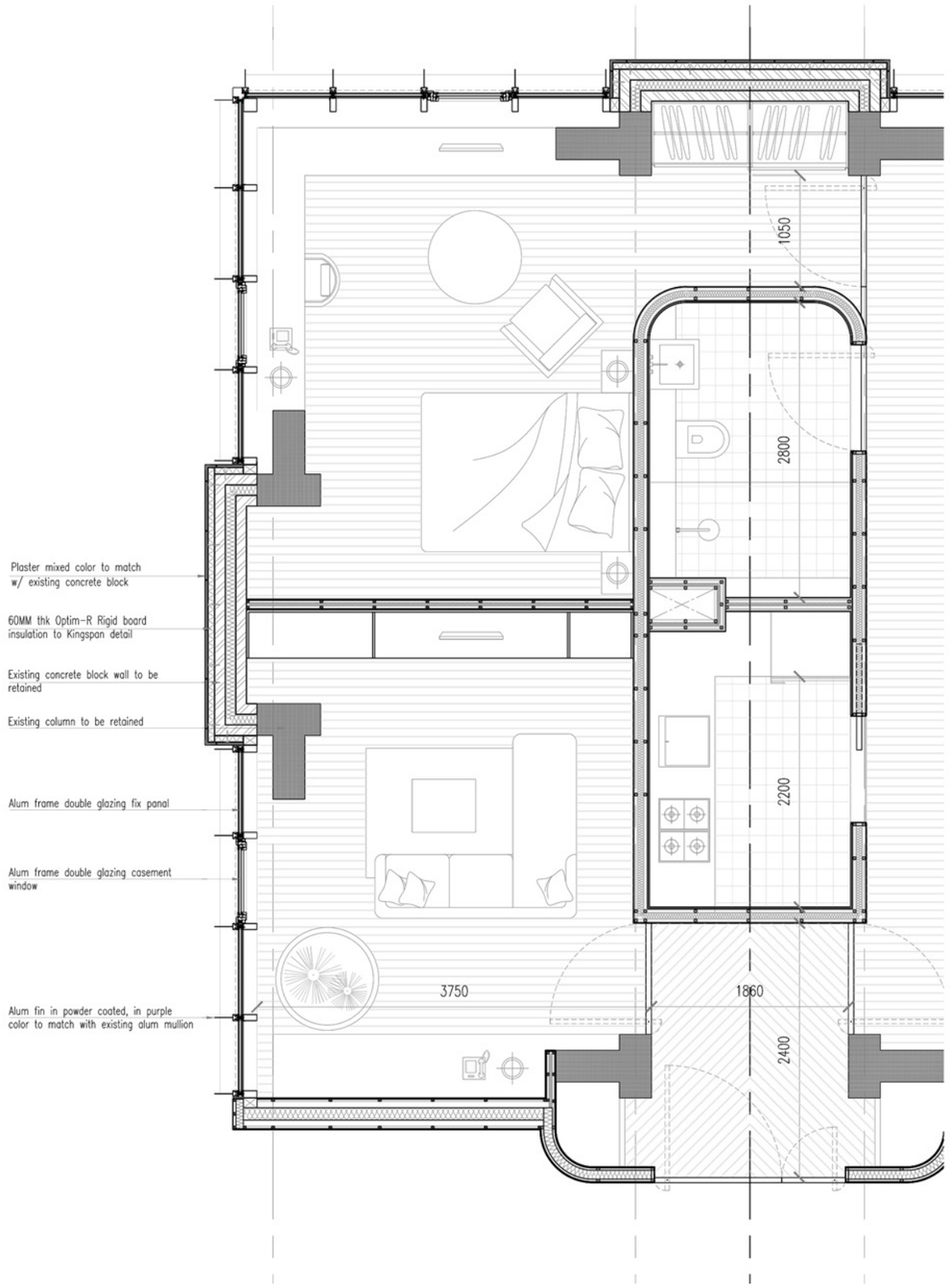
1. Estimate live load different:
Due to the changing of function from office to housing, live load will drop from 250kg/sqm to 200kg/sqm, one additional module can directly construct on top without any structural alteration.

2. Remain live load by replacement:
Another strategy is to relocation the module, removing existing module below and add new module on top to achieve better light and air quality.

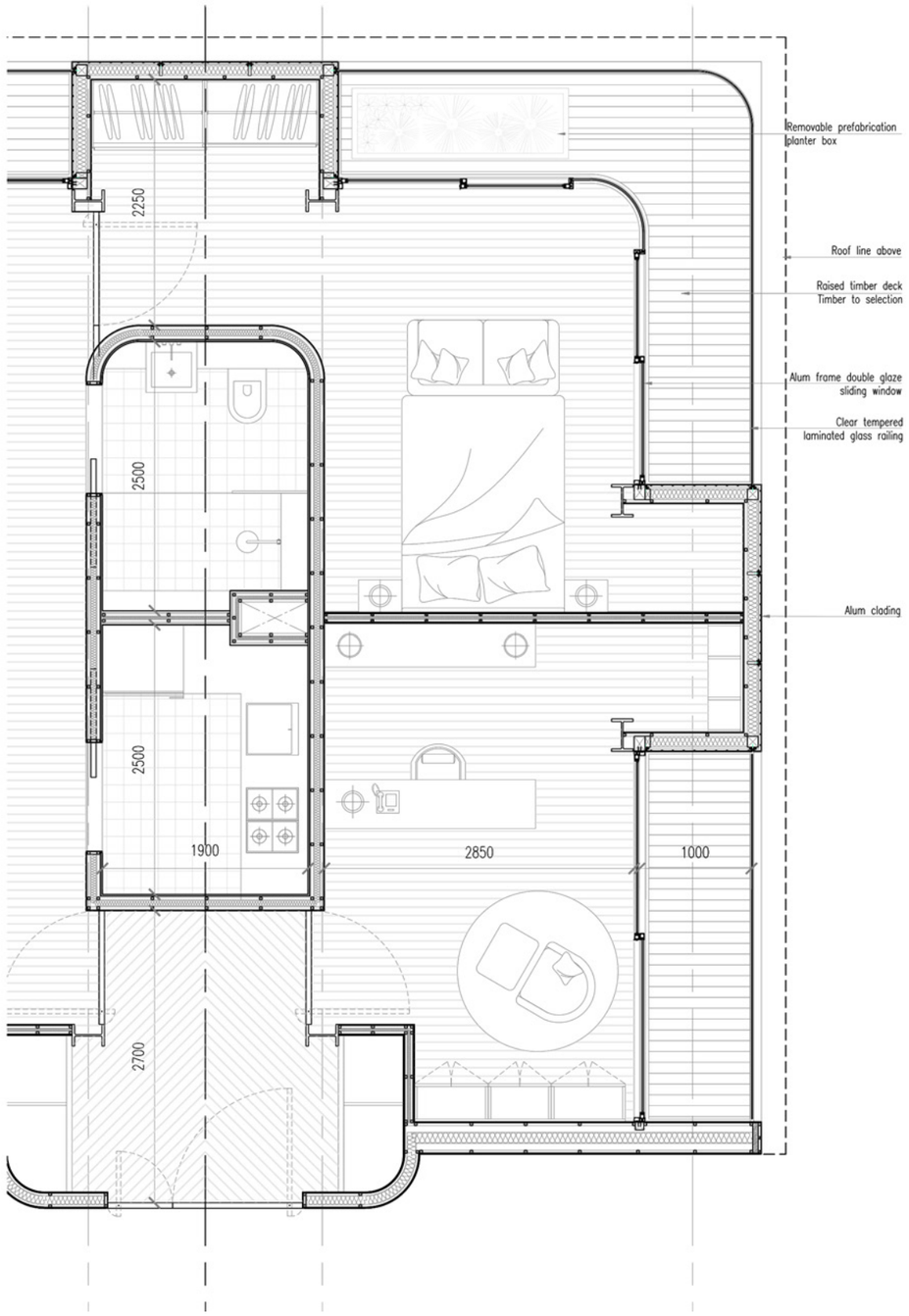


DETAIL SECTION
Connection of existing and new module
scale 1:50

DETAIL ELEVATION
Connection of existing and new module
scale 1:50



DETAIL PLAN - EXISTING MODULE
scale 1:50



DETAIL PLAN - NEW MODULE
scale 1:50

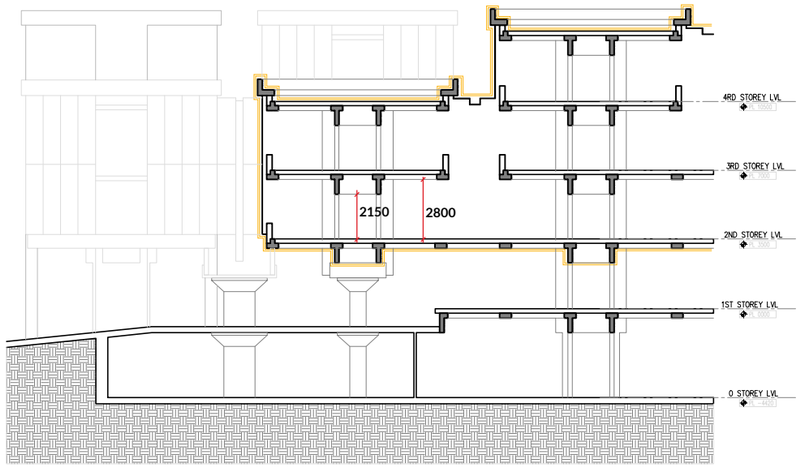
Hertzberger Quartier Detail - Construction

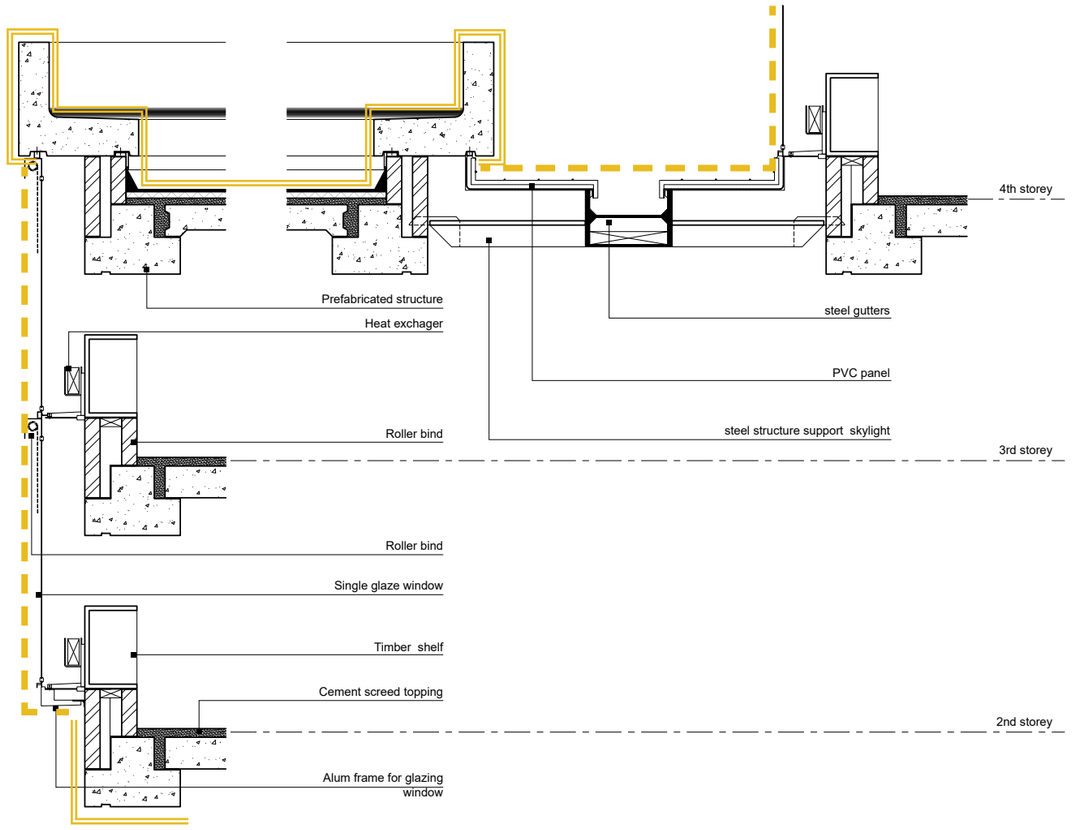
INSULATION SCHEME

Existing & new module

One of the challenge in redeveloping Centraal Beheer is the weather tightness. As the existing building has large area exterior facing glazing façade, and was built in the 70's which all glazing window is a single layer. To improve an energy efficiency of this building, insulation is necessary in all opaque wall, and all the glazing window need to be change for double glazing.

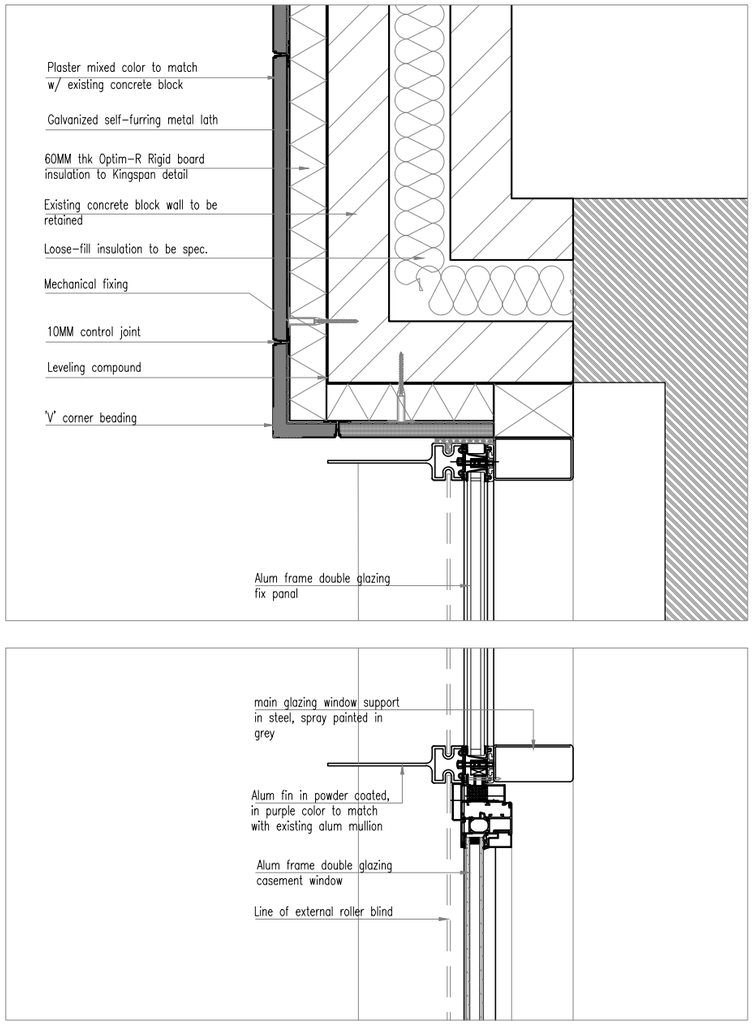
As the Interior spaces of Centraal Beheer have a very limited height from floor to ceiling, all insulation will be place outside the cavity walls. Rigid form board will be install on concrete block surface follow by plaster layer with groove line to have similar appearance as the existing. The new aluminium frame double glazing windows design to have same proportion as original window as much as possible.



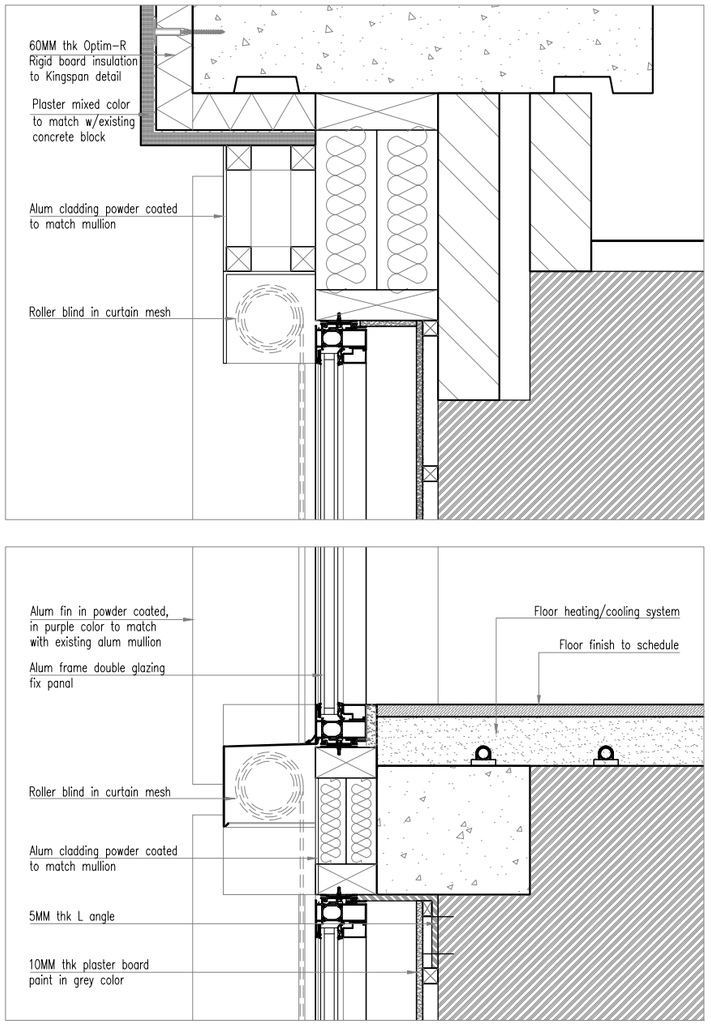


To be changed
to double glazing window to improve energy efficiency, design and composition to match with existing window

To be insulated
with rigid board to spec, finish in plaster mixed color to match with existing material

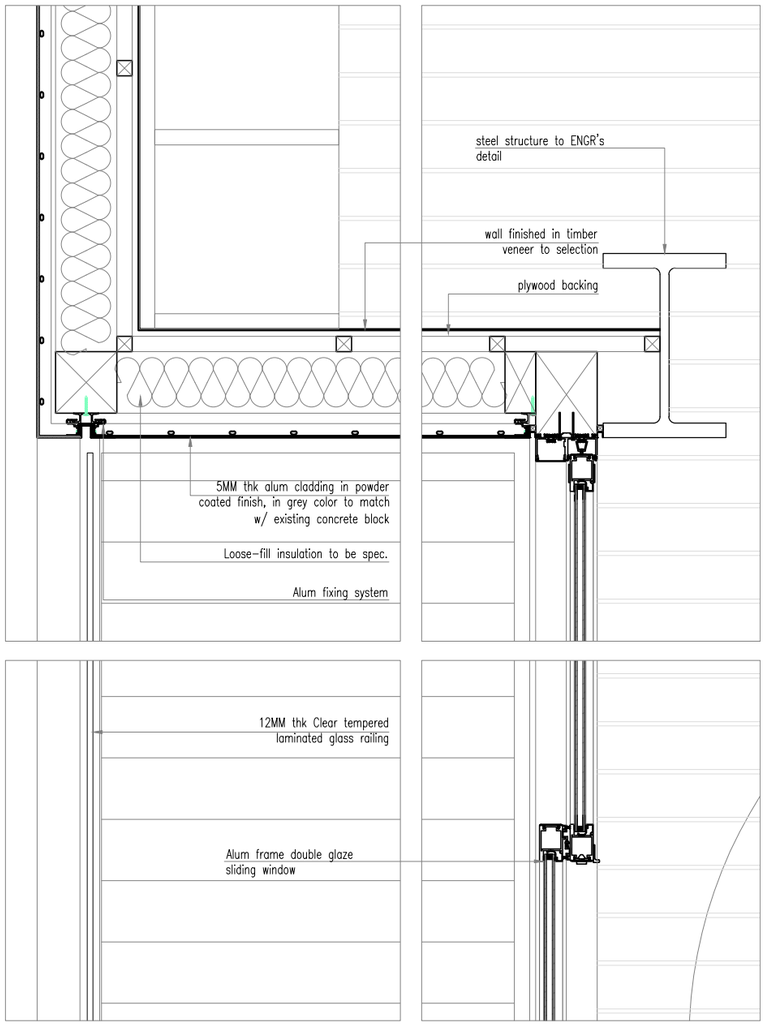


DETAIL PLAN - EXISTING MODULE
scale 1:10

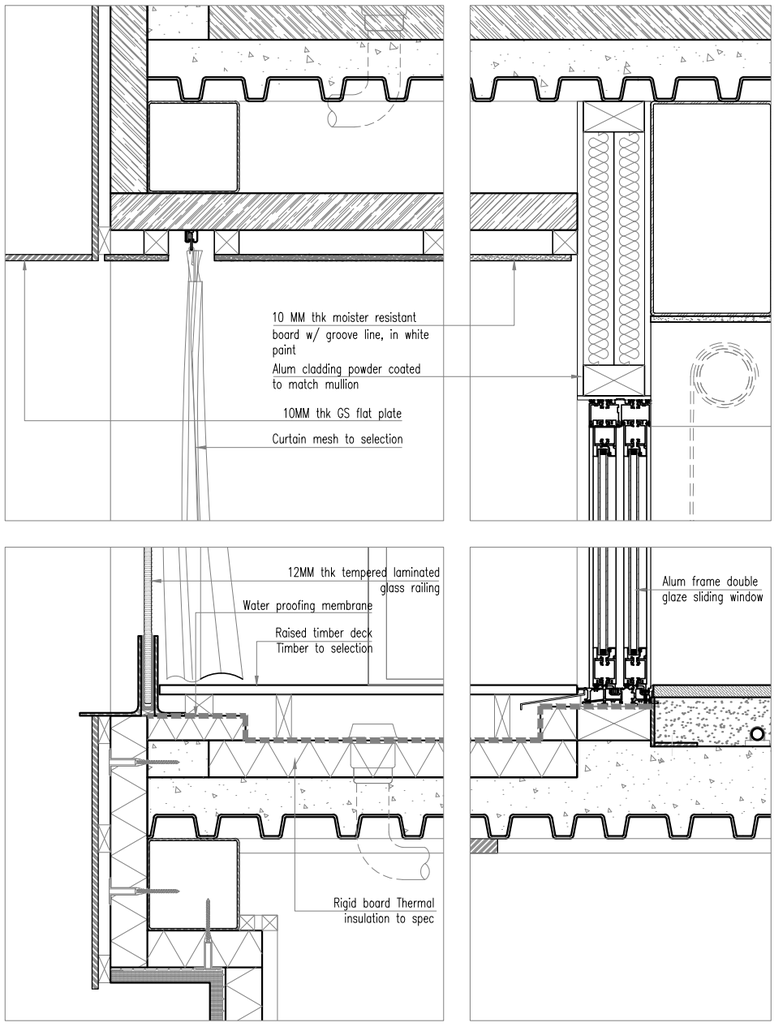


DETAIL SECTION - EXISTING MODULE
scale 1:10

Hertzberger Quartier Detail - Insulation



DETAIL PLAN - NEW MODULE
scale 1:10



DETAIL SECTION - NEW MODULE
scale 1:10

Hertzberger Quartier Detail - Insulation

CLIMATE CONTROL SCHEME
Residence & Retail

In the development of Hertzberger Quartier, the building is technically separated into two part. One is residential side; it requires different climate control system from the original function. Another zone is retail stores; climate control scheme is similar to the existing. In both zoning, balance ventilation, heating and cooling system is used. Ducting will run from the installation chamber to each module via existing cross shape service route.

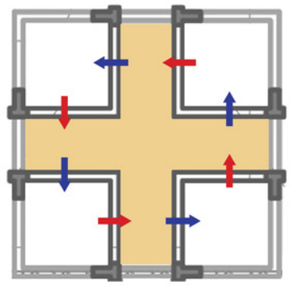
Mechanical ventilation
Balance ventilation system with heat exchange integrated system to reduce energy

Natural ventilation
Fresh air flow in to all residential apartment

Radiant floor
Hearing and cooling system lay underneath the floor to evenly warm the entire space

Geothermal
In winter - extract heat from warm well and returing cool water to cold well after heat extract, and use for summer

Water cycle
Rainwater Harvesting: Rainwater collecting by water gutter above inner street, storing for grey water reuse

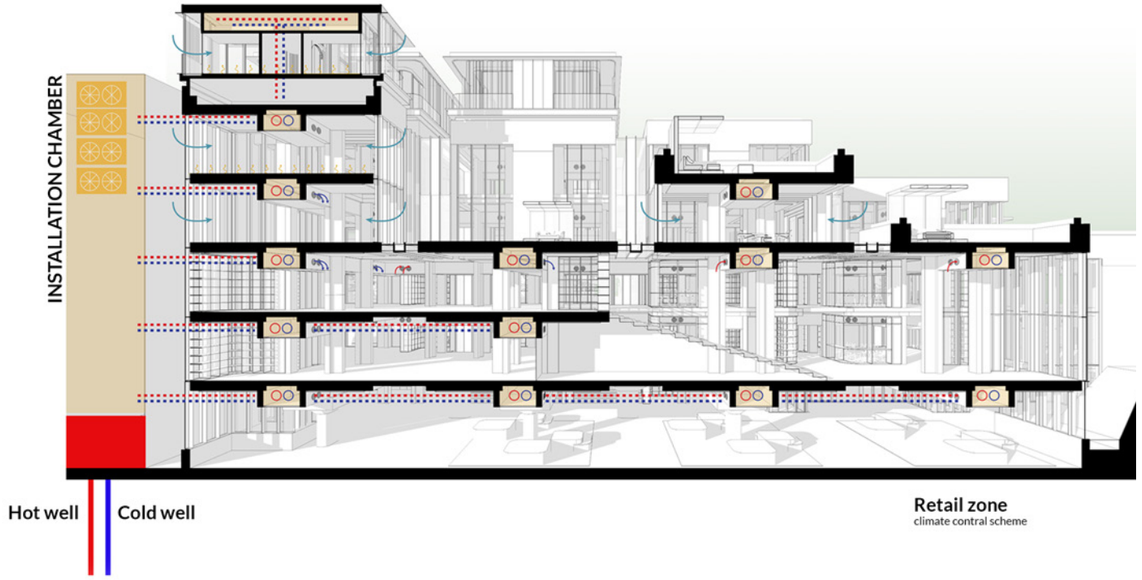


Air circulate diagram

Residential zone
climate contral scheme

Retail zone
climate contral scheme

Residential zone
climate contral scheme



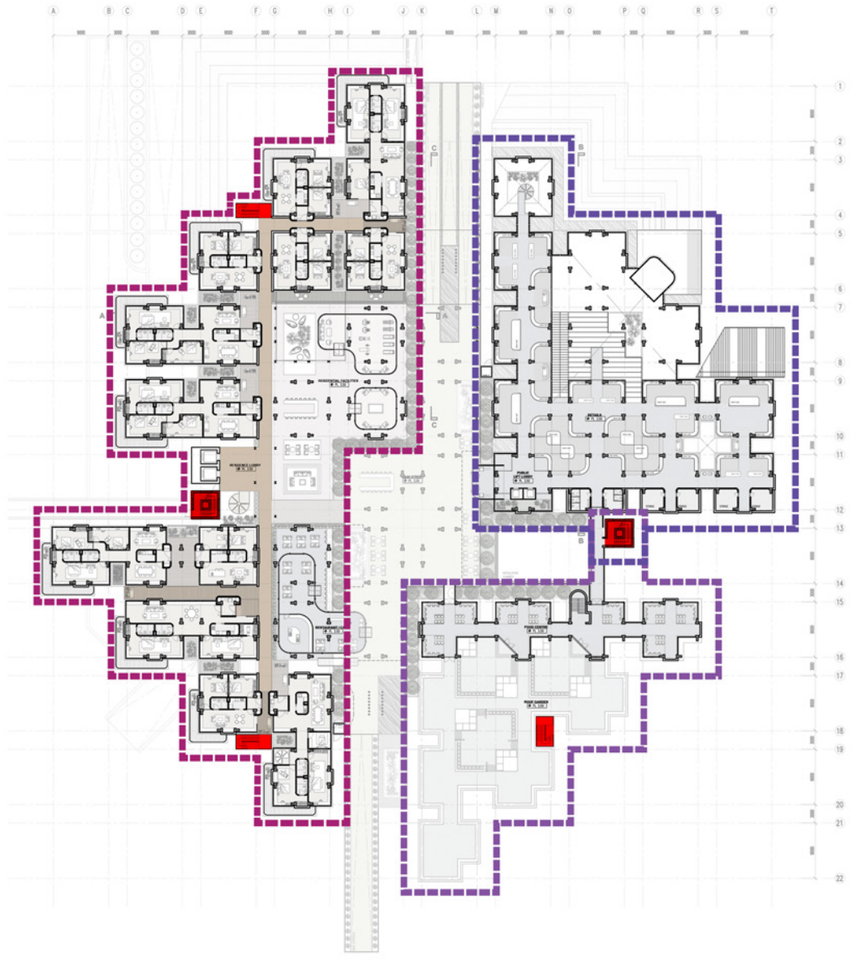
Retail zone
climate contral scheme

FIRE ESCAPE
existing and additional fire staircase

To comply with Dutch regulation on fire safety, additional fire protection and fire exit is provided in the new design. There is different fire-proof method in each zone;

Residential zone: There is one existing fire staircase in the middle between two residential wings, still two fire staircase are added at the two ends. At some corner of this zone (dead-end), fire proof materials will be used for the construction to resist the fire for at least an hour.

Retail zone: Apart from existing fire staircase, another staircase is added at the rear wing. In the front wing, sufficient fire existing is limited to some floor, so sprinkler system is introduced.



SEWAGE ROUTING
concept

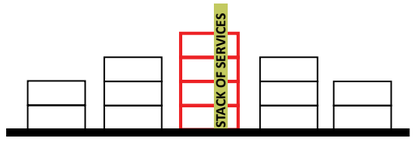
Function of this building changes from office function to a combination of public and residential function, one of the major differences is service areas. In the original design service zone are stack up in some corner of the building, but for residential, these spaces will be in every apartment unit.

The principle of sewage routing is as following:

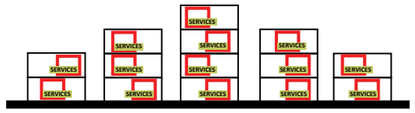
- Each universal unit will have service box in the middle to be vertical shaft. It will contain all the services function such as kitchen and bathroom

- Sewage pipe will transport vertically then horizontally at the level of different function.

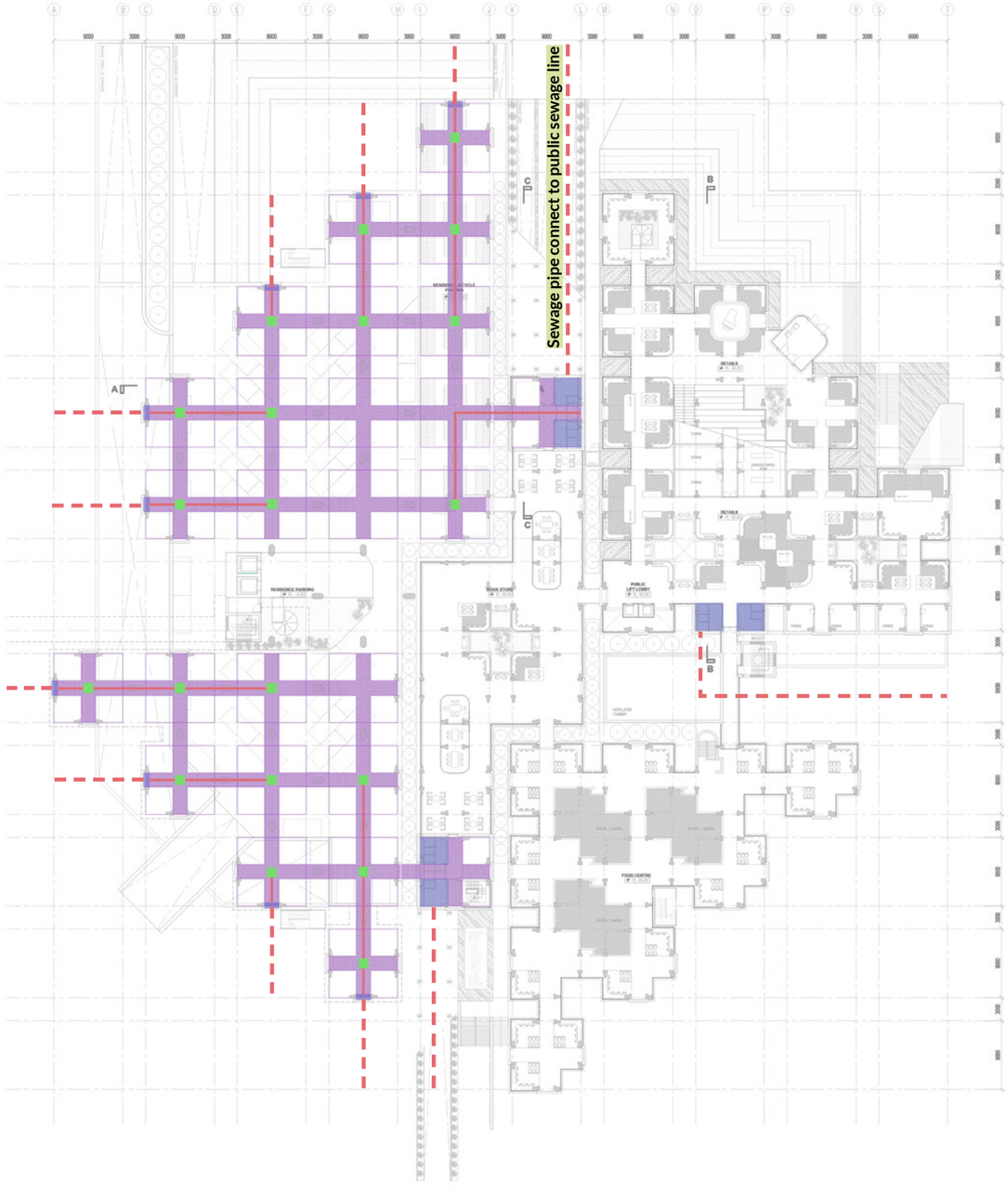
- This sewage pipe will immediately lead out of the building and connected to public sewage line



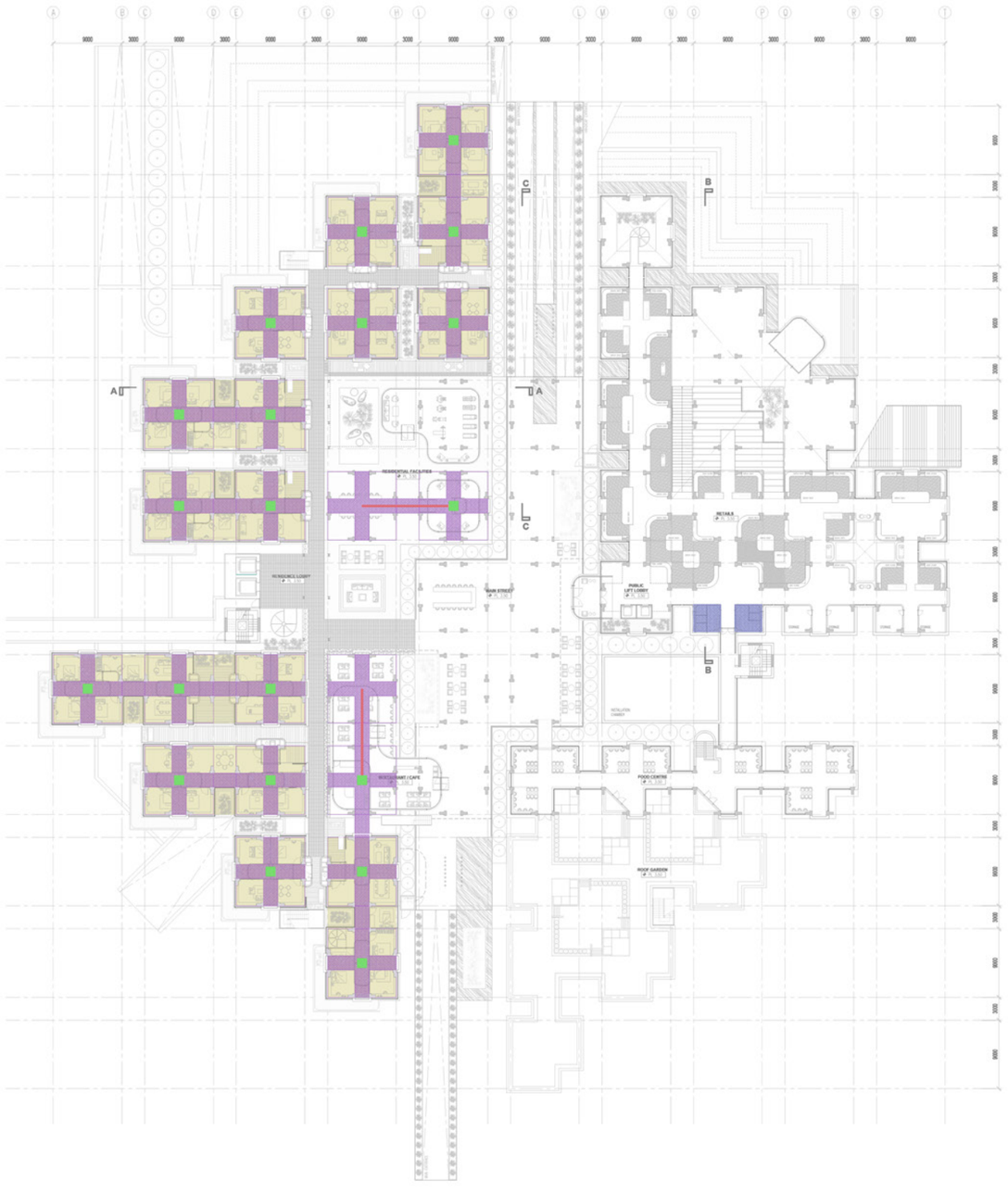
OFFICE FUNCTION



RESIDENTIAL FUNCTION

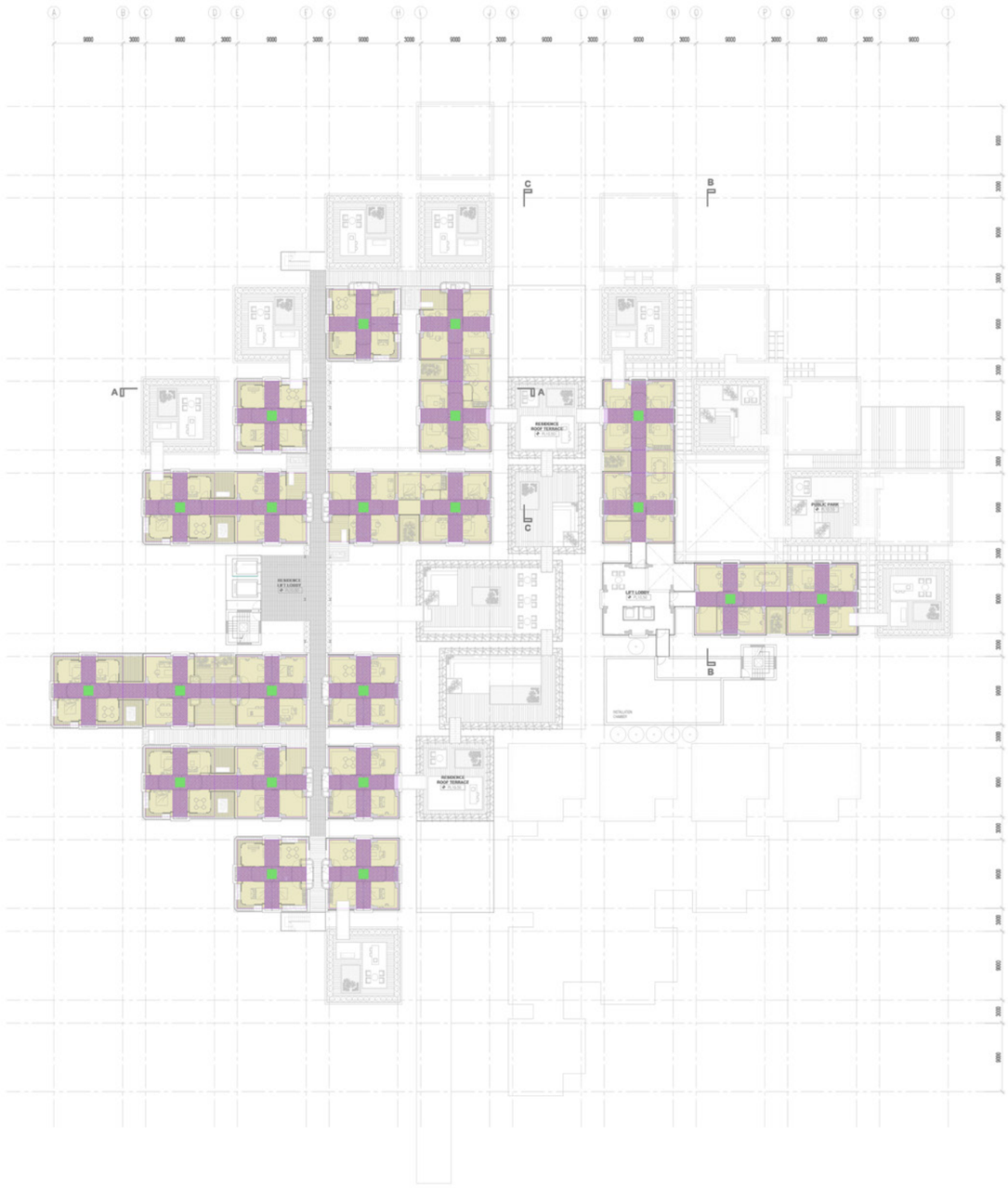


SEWAGE ROUTE- G STOREY PLAN
scale 1:750



SEWAGE ROUTE- 1ST STOREY PLAN
scale 1:750

SEWAGE ROUTE- 2ND STOREY PLAN
scale 1:750

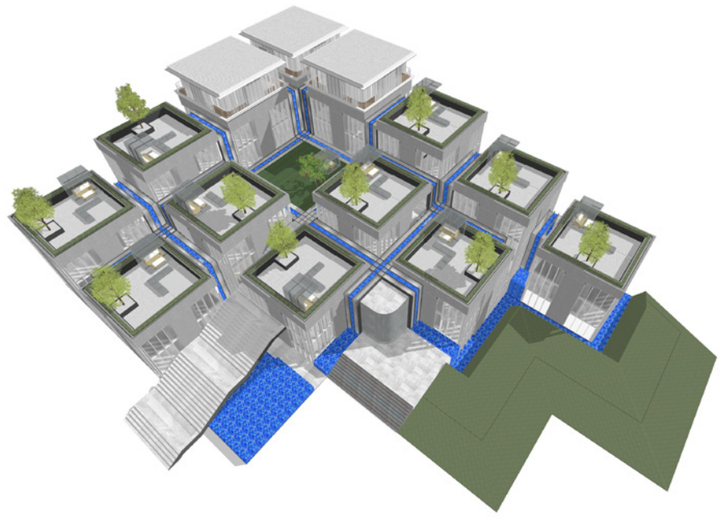


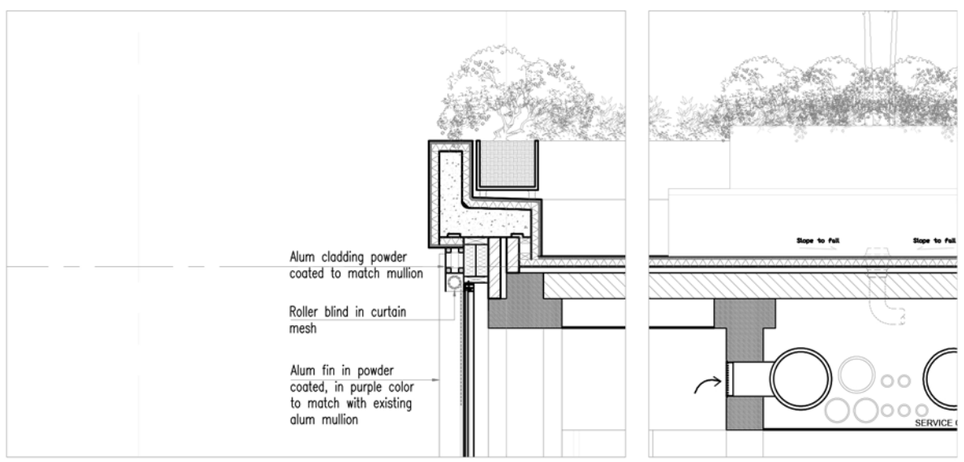
SEWAGE ROUTE- 3RD STOREY PLAN
scale 1:750

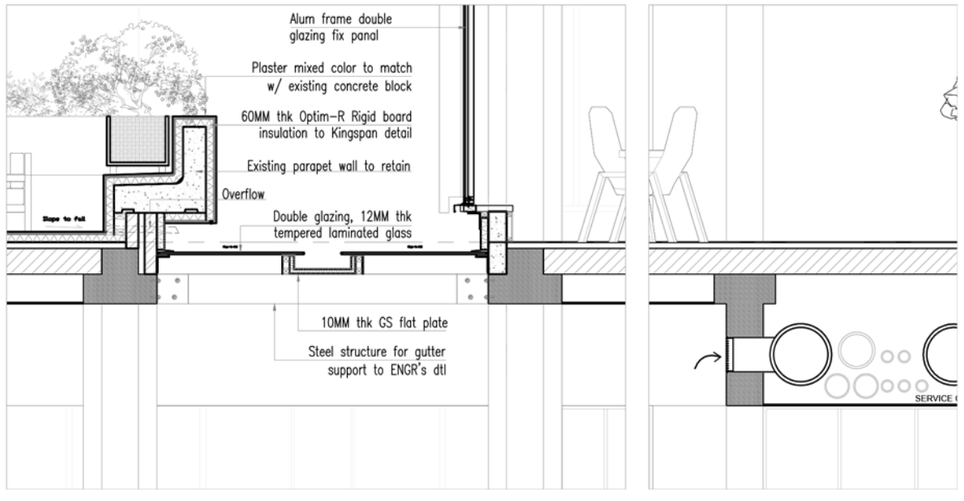
WATER MANAGEMENT
Retail zone

One of the notable design element in Centraal Beheer is integrated water gutter with skylight above inner streets. It allows natural light to penetrate through a massive building at the same time solved rainwater drainage problem as this building have huge area of roof surface.

In the new development, this integrated gutter is preserved at retail zone but change from clear pvc panel to double glazing tempered laminated glass for weather tightness. Rain water harvesting for grey water recycle is introduced for the new development.







DETAIL SECTION - WATER GUTTER
scale 1:50

HERTZBERGER QUARTIER

Residence & Retail & Recreation

Goals of graduation project

Throughout this graduation project, several aspects/issues on the adaptive reuse of the structuralism architecture monument have been investigated and developed through the redevelopment of Centraal Beheer. The main goals of this research could be categorized into two topics.

One is related to the studio theme ***'the future of structuralism architecture'*** by study the future possibilities of this abandoned Centraal Beheer through some architectural experimentations. The changing of function was selected as the main topic of my trials. The original office building for 4000 people will be transformed into the new multi-function complex of residential, retail and recreation space.

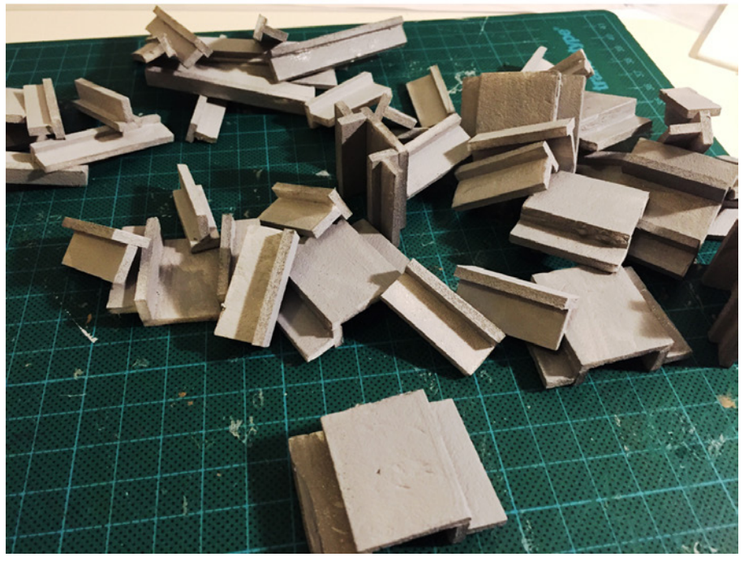
Another topic is related to post-war architecture, as an adaptive reused has become one of the main challenges for the architectural society nowadays. Buildings in this era have reached the decayed stage which needed to be addressed. The reuse of this extant built fabric is the sustainable solutions. So the goal of this graduation project is ***to find the right balance between retaining existing values and offering present and future demands.***

What is added values?

As usual design principle of heritage and architecture, the main ambition of Centraal Beheer redevelopment is to retain existing value as much as possible. Both physical appearances and intangible aspects have historical value which should be preserved. At the same time, searching for the best solution to improve all the challenges from urban scale, building scale to technical scale is another ambition.

However, by transforming a single function to multi-function building, different intervention strategy is applied in each functions in order to create an appropriate design for the user. All interventions are limited by human-based design philosophies and some notable physical qualities of Centraal Beheer.

After research by design, experiment on various options on different issue, provided the cut to shape end product. An appropriate transformation gives a new life of the building while maintaining the original values.
The position of Centraal Beheer is shifted from being a city to being just one 'Quartier' of Apeldoorn city. The design intervention physically connected this development to other urban fabric. Also the functions provided in Hertzberger Quartier help transforming an abandon building to be an icon for everyone in Apeldoorn city. However, Herman Hertzberger's soul is still in the development. Some remain in physical appearance, while some is implemented in the design approach. These additional layer and new interpretation of existing module show the evolution of structuralism through time.



The future of structuralism architecture

One of the significant design ideas of structuralism architecture is to let the building grow and to be flexible for the changing of usages through time.

In Centraal Beheer, Herman Hertzberger realized his plan with a single function over the whole building as an office complex. The provision for flexibility is only on a universal unit level that can be used for various functions; working space, socializing area, and services zone. During the transformation process, the design for flexibility in Centraal Beheer has turned out to be very rigid and specific. The requirements of residential function couldn't be achieved without any addition and alteration. Also, Herman Hertzberger once said in the lecture at TU Delft that 'residential is the most difficult function to adapt in Centraal Beheer regarding several limitations of existing qualities'

In contrast, I see these existing constraints as a challenge. By researching on this graduation project for a year, I strongly believe that residential function can be implemented in this icon of structuralism architecture. The end product has shown that it is not only an ordinary housing development but it is a 'vertical community' where everyone live and play together. The human-based design ideas of structuralism movement have large influence on the success of final result.

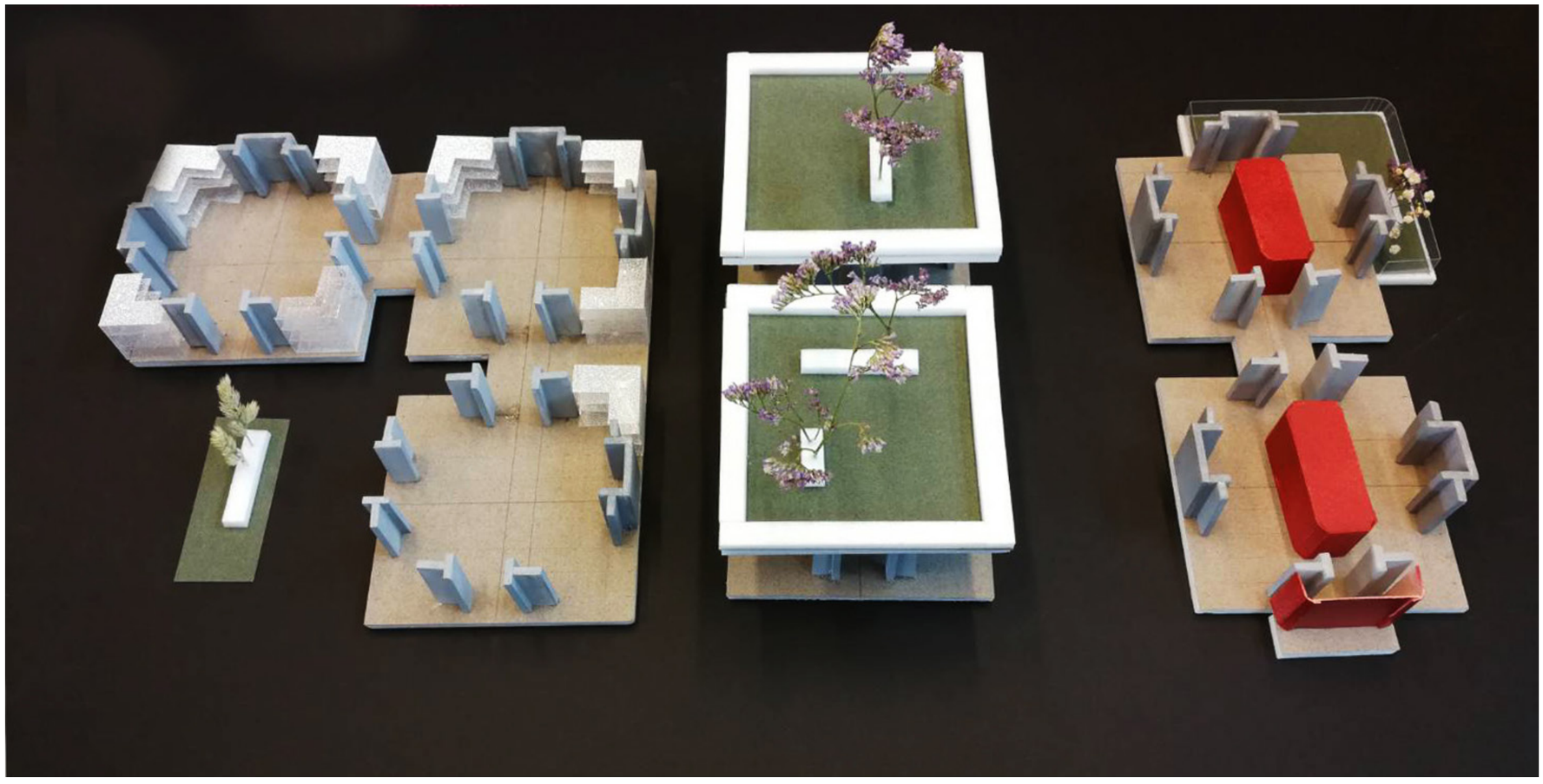
With the accomplishment of transforming Centraal Beheer to the most difficult program (residential development), I confide that in the future, other functions can be adapted to this iconic piece of structuralism architecture.

Balance of lost and gain

Structuralism architecture results from very unique design philosophies. Humanist based design that is against rationalism. The structuralist architects have interpreted these strong ideas differently on a various project to create an appropriate design for different functions. In this case, Herman Hertzberger creating a massive 40,000Sqm volume which composed of 9Meters x 9Meters universal units in Centraal Beheer as an Office Building

In order to transform these structuralism architectures, change an existing program to the new function while retaining structuralism design philosophies, obviously, there will be some amendment to original appearance. This cause a major confliction between the heritage preservation and the future of structuralism architectures.

For this graduation project, I am testing the different proportion of lost and gain throughout the whole design process. I try to find the minimum and maximum intervention framework on different scale. In the redevelopment of Centraal Beheer, some physical appearance may differ from the original design, but in general, it gains a better quality and prolong the life of this structuralism icon.



COMPARISON

Centraal Beheer & Hertzberger Quartier

Series of images compare the quality of original design and the new development, showing how the new design retains, reinterprets and implements Herman Hertzberger design philosophies in each part of the building?

POSITIONING

Relationship with context

In physical, this icon of structuralism architecture is remained as original design regarding form, composition and façade. The design intervention have shifted the position of this building from an isolated introvert building to be one of the iconic building of Apeldoorn.

EXTENSION

Overall building mass

New universal units are added in the new design with the concern of original massing in 'Hill shape'. The design of these extension is guided and limited by design composition of existing universal module. By adding these new units, it shows the growth of Centraal Beheer in the changing of time.

ENTRANCE

Main entrance of the complex

¬An addition of ramp in the original entrance connects street level and the building together, helps improve relationship of Centraal Beheer and surrounding context. This welcoming entrance transform an introvert to extrovert building.

MAIN STREET

Reinterpretation of ‘street’

An inner street in the original circulation and service core is transformed to be a semi indoor ‘main street’. Even though the physical appearance might differ from the original design, still the core idea of this street is well retained. An idea of ‘Gray area’ being more than circulation space but also socialize space with vertical horizontal and diagonal connection.

TERRACE / COURTYARD

Residential zone - Retail zone

Series of outdoor space are spread all over this massive office building to provide a relieve and pleasant view for the users. In the redevelopment, some universal units are removed to create communal spaces and to improve quality of interior space.

INNER STREET

Residential zone

A transformation of dark circulation routing in the office function to an airy and bright corridor for HQ residence. The Idea of community spirit that Herman Hertzberger used in his housing developments, is adapted and applied in this residential zone. Pocket socialize space is integrated in the design of the apartments, encourage for social interaction between neighbor.

UNIVERSAL UNIT

Retail zone

Restoration of original composition and design in the new retail function. Exposed structure, use of rough and neutral materials, division of spaces is well retained. Full height prefabricated shelves are added to the four corner for retail uses.

Testing of design interventions

The research of design method and approach in this graduation project is not only limited to the use of structuralism architectures, but also can be a design manual for other similar type of architecture.

THE DESIGN OF MAIN STREET

ART MUSEUM OF SAO PAULO

Sao Paulo, Brazil

Architect: Lina Bo Bardi
Year 1956 - 1968

Intangible aspect : Experience/ spatial quality of space

Design goal : Improve physical connection of building and context

Intervention framework : Transforming introvert to extrovert building

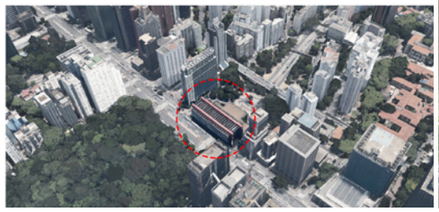
Design method : Human based design

Scale - Gradually lead people from outdoor, semi outdoor, semi indoor to interior space

Activities - Turn circulation space to be informal social interaction space

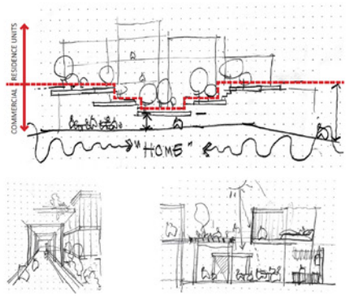
Perception - Create transparent building with the combination inside-out and outside-in design approach

Design description : The art museum of Sao Paulo has similar zoning arrangement and posed problem with Centraal Beheer. A solid boundary vertically or horizontally disconnects the building from context eventhough the building is located in the prime area. The human based design method will create a welcoming entrance for the user and therefore seamlessly merge the building to urban fabric.



Centraal Beheer Head Office
Apeldoorn, Netherlands
Architect: **Herman Hertzberger**
Year: 1967-1972

Art Museum of Sao Paulo
Sao Paulo, Brazil
Architect: **Lina Bo Bardi**
Year: 1956-1968



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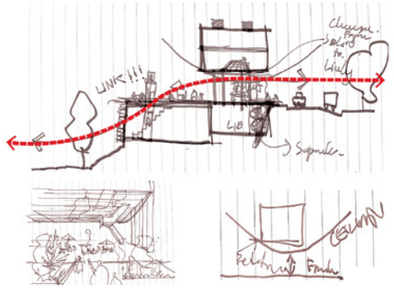

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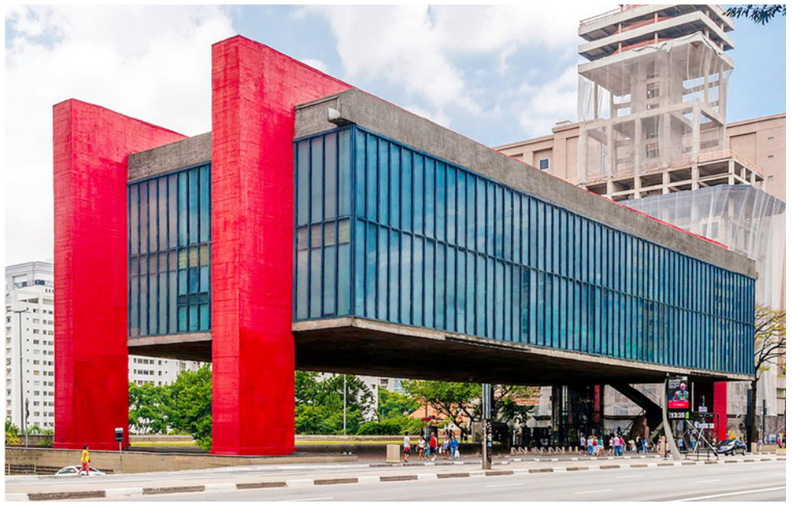

VIEW TOWARD MUSEUM ENTRANCE
Art Museum of Sao Paulo

VIEW OF PUBLIC PLAZA
Art Museum of Sao Paulo

INTERVENTION TO MODULAR SYSTEM

PETROLEUM RESERVE TERMINAL

Texas, USA
The Houston Fuel Oil Terminal Company

Physical aspect : Repetition of modules (universal unit)

Design goal : Balance between existing qualities and new requirement

Intervention framework : Transform single function to multi-function complex

Design method

: **Main circulation routing**
To lead user from the entrane to different function, and provide safe and secure feeling.

Characterize
To transform exisitng structure to an appropriate design for each function

Design description : In the future, relatively decreasing of natural fuel, these petroleum reserve terminal will be empty. According to the large amount of areas around the world that is devoted for these function, the most sustainable solution dealing with this problem is to find an appropriate design approach to transform this oil tank farm to some other function.

The study of Centraal Beheer redevelopment can be adapt to this typology of extant built fabric since it has similar physical appearance. The repetition universal unit give no sense of direction in the development, this problem can be addressed by the provision of main street. To achieve a good transformation, the design need to fulfill requirements of each function. Each zone will have different intervention strategy and constraint by existing quality. So the out product of each zone will be different but still have unity design language as a whole.